

Growing Baldock

Environmental Statement Volume 2: Figures & Appendices

Chapter 12: Ground Conditions and Soils

Appendix 12.6 Technical Documentation Road and Bridge – Option 1



SHADBOLT
ENVIRONMENTAL



Baldock, North Hertfordshire
Road and Bridge

CD 622 Technical Documentation
Road and Bridge – Option 1

Urban & Civic

Issue V1

February 2024



SHADBOLT
GROUP

Baldock, North Hertfordshire

Road and Bridge

CD 622 Technical Documentation

Road and Bridge – Option 1

Client	Urban and Civic
Our Reference	Baldock, North Hertfordshire - Road and Bridge
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Submitted	Issue V1 – February 2024

Urban&Civic



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PREAMBLE

Shadbolt Group (SG) were commissioned by the Client, **Urban & Civic (Corby) Ltd.** to prepare documents in accordance with the Design Manual for Roads and Bridges document CD 622 Managing Geotechnical Risk, relating to the proposed new road including a new bridge over the existing railway and additional new pedestrian bridges over the railway at the proposed development on the site referred to as Baldock, North Hertfordshire.

It is understood that there are currently two planned pedestrian bridges and five options for the run of the road and vehicular bridge under consideration. The current report considers Option 1 for the vehicular road and bridge only.

This report is intended to form a single document covering the pre-construction technical reporting requirements of CD 622 from Statement of Intent through to the Geotechnical Design Report. The current version of the report (V1) incorporates all elements up to and including the Ground Investigation Report. The report will be updated to include the Geotechnical Design Report upon receipt of relevant design information and to incorporate the Special Geotechnical Measures Form elements if deemed to be required.

The proposed options for the proposed road and bridge railway crossing are shown on Royal Haskoning DHV Drawing Ref. PC3381-XXX-XX-XX-XX-X-0100 rev P01, "Location Plan" which is presented in **Appendix B** for reference.

1.0 STATEMENT OF INTENT (SOI)

1.1 Details of the Project

Urban & Civic (U&C) are currently in the planning stages for a proposed mixed residential and commercial development to the east of the town of Baldock, North Hertfordshire.

At the time of writing, the proposed developments are still in the planning stages and the site is comprised predominantly of agricultural land for cropping or grazing.

A vehicular road and bridge crossing the existing railway is proposed as part of the wider development to provide access between the new proposed development areas to the north and south of the railway line. There are currently five options being considered for the route of the vehicular road. The current report considers Option 1 only, the approximate location of which is indicated on Figure 1 below.



Figure 1 – Approximate Location of Proposed New Road and Bridge Crossing – Option 1

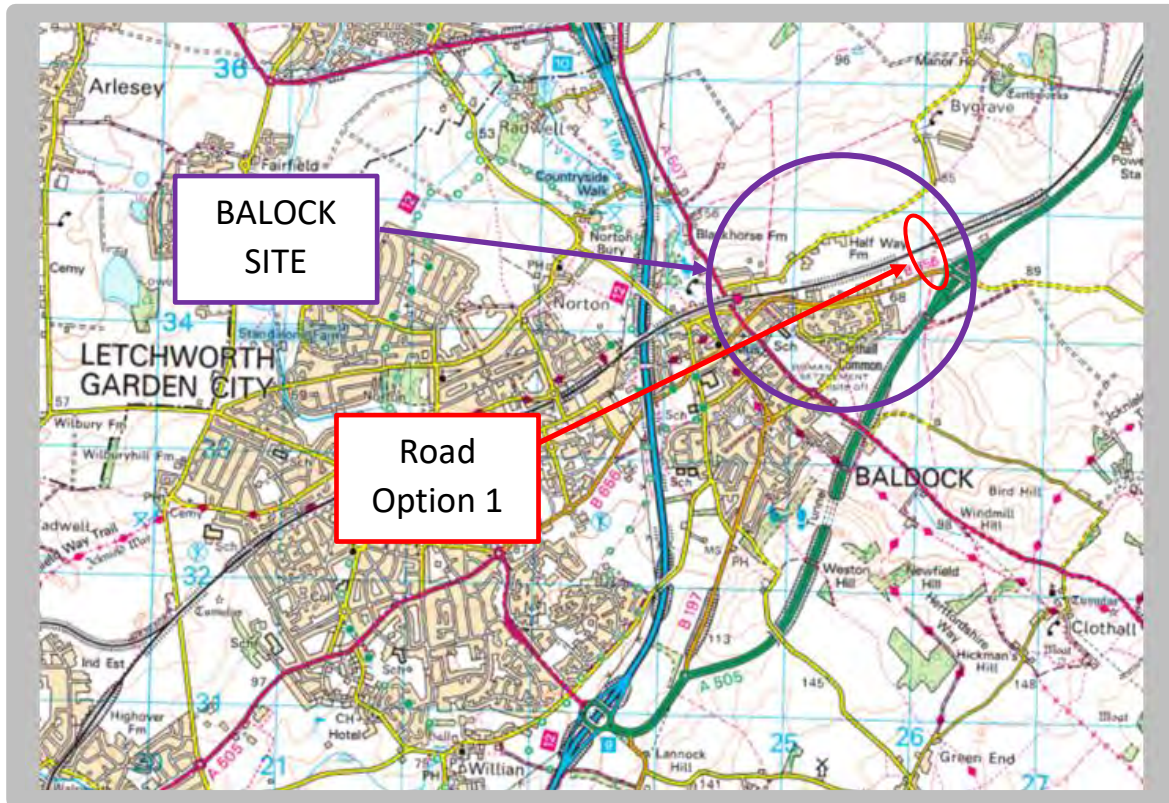


Figure 2 – Site Location in Regional Context



Figure 3 – Aerial Photo Showing Location of Road Option 1 within Baldock Development

1.2 Objectives

SG have been commissioned by U&C to produce documents to satisfy the requirements in accordance with CD 622.

The objectives of the development proposals are to create a permanent vehicular access linking developments north and south of the railway line and provide improved access to the A505 to the proposed development.

SG's commission is to review previous relevant reports and site investigation works undertaken and provide standalone documents in relation to the construction of Road and Bridge – Option 1 as proposed.

1.3 Existing Information

Previous reports outside of the current CD 622 standard relating to Road and Bridge Option 1 include:

- 77000739-DS – Baldock North Infrastructure, Vehicle and Pedestrian Bridge Desk Study, September 2020, WSP
- 77000739_VBGIR – Baldock North Vehicle Bridge, Ground Investigation Report, November 2020, WSP
- 2899 – Baldock, North Hertfordshire, Preliminary Risk Assessment, Issue V1, July 2022, Shadbolt Group

The previous WSP report were carried out slightly to the east of the current investigation as the proposed route of the road has now been altered, however, given the proximity of the investigation area the findings are considered to be relevant to the current investigation.

1.4 Geotechnical Risk

1.4.1 Key Geotechnical Risks

The site is not located within a coal field and from preliminary searches however there are 6 No records relating to non-coal mining areas recorded by the BGS or the Coal Authority (CA) within 1000m of the site. 4 No. of these non-coal mining areas are recorded as encroaching onto site and refer to potential Chalk mining. The likelihood is noted as “sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered.” In addition, none of the former workings, such as ponds or chalk pits are shown to be located within the proposed Road Option 1 area of the site.

There are no records relating to underground working, mining cavities, JPB mining areas, brine areas, gypsum areas, tin mining, clay mining, natural cavities recorded by the BGS or the Coal Authority (CA) within 1000m of the site.

Surface ground workings are shown along the route of the existing railway line identified as “cuttings”.

The BGS consider the risk to the site from natural ground subsidence due to shrink/swell clays, running sand, compressible deposits, collapsible deposits, landslides, and ground dissolution of soluble rocks all to be at the maximum “very low” on the area of the site in the vicinity of Road Option 1 and for several hundred meters surrounding the proposed road route.

Furthermore, the site is located within an area where the BGS and EA have identified a risk of soluble rock. The maximum soluble risk category identified in the subject area is deemed to be "Significant soluble rocks are likely to be present. Problems unlikely except with considerable surface or sub-surface water flow".

Two faults are noted within the Groundsure report for the whole Baldock development site; however, these are located over 500m northwest from the subject area of this report.

The primary geotechnical risk at this stage is considered to be potential slope instability of the proposed embankment and interaction with the existing railway line embankment. Although considered to be very low risk the potential for soluble rocks exists below the site which given the potential sensitivity of the bridge may be significantly impacted by management of drainage from the new development and road/bridge.

The key geotechnical risks are presented in the Geotechnical Risk Register, presented in Section 7.

The Geotechnical Risk Register is a live document and will be updated at each stage of the reporting process and may be reviewed at any stage if required.

1.4.2 Geotechnical Category

The proposed works are for the formation of a new embankment and bridge to allow road construction for vehicular access across the existing railway line and at this stage are classified as Geotechnical Category 2.

This will be reviewed as the project progresses and further information and assessments become available.

1.5 Proposed Studies and Investigations

A general site investigation has been undertaken across part of the proposed development. A series of targeted site investigations along the possible proposed routes of the new road were carried out concurrently as part of the more general site investigation. Some areas were not accessible during the initial site investigation and further works are planned. The planned route of Road and Bridge - Option 1 which is the focus of the current report was fully accessible based upon the currently planned route.

In accordance with CD622 the following report elements will be combined within this report for the Road and Bridge Option 1.

- Statement of Intent (SOI)
- Preliminary Sources Study Report (PSSR)
- Ground Investigation Report (GIR)
- Geotechnical Design Report (GDR)*
- Special Geotechnical Measures Form (SGM)**

* The GDR is outstanding in the current version (V1) of the report. The report will be updated upon receipt of the design documents.

** Subject to OOGA requirements, not expected to be requested at this stage.

1.6 Specialist Consultation

Discussion are ongoing with Network Rail with regards necessary clearances and design requirements.

Ongoing consultation in relation to archaeology is ongoing as part of the planning process and it is expected that consultation in relation to ecology and landscaping of the proposed public open spaces planned as part of the whole development will be required. Although taking part for the whole development site it is possible that the conclusions of such consultations could impact the road construction.

1.7 Programme

The SOI PSSR, and GIR elements are presented within this combined report for review in February 2024.

The GDR and SGM (if required) elements will be included within future revised report upon receipt of design documents for the proposed road and bridge.

The proposed development is currently in the planning and design stages and the project timeline has not yet been finalised. The GDR and SGM (if required) elements of this report will be updated upon receipt of the relevant data. A Geotechnical Feedback report will be produced on completion of the construction phase.

2.0 PRELIMINARY SOURCES STUDY REPORT (PSSR)

2.1 Introduction

Following on from the above Statement of Intent (SOI) the following sections present a summary of existing Desk Study data in relation to potential geotechnical risks in the development of Road Option 1.

The proposed highways link is to comprise a single carriageway road with an embankment either side to elevate the carriageway and associated abutments for the proposed bridge to cross the existing railway line. The carriageway is currently on the order of 482m in length. We understand that detailed design of the road route, carriageway and embankments is underway. This report will be updated upon receipt of the detailed design.

The proposed carriageway and bridge arrangement is shown on Royal Haskoning DHV drawing No. PC3381-XXX-XX-XX-XX-X-0100 Rev P01 presented in **Appendix B**.

2.2 Sources of information, desk study, site reconnaissance, site description and review of findings

Data has been obtained from the following sources:

Review of previous Desk Study and Ground Investigation carried out by WSP on behalf of Hertfordshire County Council for the previously proposed crossings;

- 77000739-DS – Baldock North Infrastructure, Vehicle and Pedestrian Bridge Desk Study, September 2020, WSP
- 77000739_VBGIR – Baldock North Vehicle Bridge, Ground Investigation Report, November 2020, WSP

A Preliminary Risk Assessment was undertaken for the Baldock, North Hertfordshire development by Shadbolt on behalf of Urban&Civic. The area of Road Option 1 is located towards the eastern end of the Baldock development for which the PRA was commissioned.

- 2899 – Baldock, North Hertfordshire, Preliminary Risk Assessment, Issue V1, July 2022, Shadbolt Group

2.3 Summary of Previous Reports

The previous WSP Desk Study report was carried out for a proposed vehicular road bridge and pedestrian bridges with the Ground Investigation Report issued for each of the schemes.

The vehicular road and bridge considered by the WSP report left the roundabout linking the B656 and Royston Road and arced northwards, crossing the railway at the current pedestrian crossing. For comparison, Option 1 covered by this report leaves the B656 approximately 150m west of the roundabout and crosses the railway 75m west of the pedestrian crossing.

The fieldwork carried out and reported in 2020 included machine excavated trial pits, window sample boreholes, and rotary boreholes to a maximum depth of 15.50m bgl along with associated in-situ and laboratory testing and a geophysical survey.

The ground conditions encountered a profile of Topsoil (max 0.40m) over Subsoil (max 0.70m) over bedrock deposits of the White Chalk Member soils of structureless/structured Holywell Nodular Chalk. The structureless chalk was encountered to between 0.80m and 2.90m depth overlying the structured chalk encountered to the maximum depth investigated. No significant groundwater was encountered during the investigations or during subsequent monitoring.

The recent Preliminary Risk Assessment was carried out by Shadbolt and reported July 2022 was carried out on the whole Baldock proposed development site of which the current area under investigation is located on the eastern edge. Review of the information within the desk study indicates that the area has remained as agricultural land throughout the recorded history apart from the construction of the railway line which was established prior 1881 which is the earliest historical map available.

2.4 Site Reconnaissance

A site reconnaissance visit was undertaken by Shadbolt Group in June 2022.

The whole proposed Baldock development site is an irregularly shaped plot of land located east of the town centre of Baldock, approximately 23km northwest of the county town of Hertford. It comprises agricultural land and was predominantly cropped with barley and potato at the time of the initial site visit.

The area in the vicinity of Road Option 1 is located towards the eastern end of the site as a whole and straddles the existing railway line.

The area to the north of the railway line slopes moderately downwards to the southwest and is arable land and bounded by Ashwell Road to the north with further areas of arable land to the east and west.

The railway line lies atop an embankment lined with timber fencing either side of the railway and with overhead power lines along the route. A pedestrian level crossing is present in the east approximately 75m east of the proposed Road Option 1. At the crossing point the railway embankment is relatively low lying but becomes significantly higher to the west and moves in to cut to the east.

The area to the south of the railway line is also arable land with the B656 (Royston Road) bounding the site to the south. Further agricultural land is present to the west with a kennels to the east. The general topography in this area is flat dipping slightly to the west.

To the southeast of the site boundary is a roundabout with a slip road leading to the A505 dual carriageway road leading northeast.

An area of Local Authority owned public open space is present south of the B656 surfaced with rough densely vegetation and cross by several public footpaths.

No obvious olfactory or visual evidence of significant contamination was noted during site reconnaissance.

No significant changes were noted during the fieldwork in October – December 2023 except the land was in differing stages of the cropping process that noted previously.

2.5 Ground Conditions

2.5.1 Geology

Published BGS maps (at 1:10,000 and 1:50,000 scales) have been reviewed via the BGS Maps Portal. Sheet explanation of the British Geological Survey. 1:50 000 sheet 221 Hitchin (England and Wales) and 1:10,000 sheet TL23SE (Weston) are obtained as part of the Groundsure Geo-Insight report for the Baldock, North Hertfordshire development.

The mapping indicates Made Ground and Worked Ground to be present along the railway line. The “Made Ground” is shown to the west with “Worked Ground” indicated to the east indicative of the switch from embankment to cutting along the route of the railway line.

Both the 1:10,000 and 1:50,000 scale map sheets indicated that there is no significant superficial deposits across the majority of the site however bands of superficial deposits do cross the site roughly northwest to southeast.

The superficial geology underlying the site is indicated to comprise Head Deposits (clay, silt, sand and gravel). On the 1:10,000 scale sheet these deposits are described more specifically as Dry Valley Deposits: Brown sandy silt or clay with chalk and flint pebble.

The solid geology underlying the site comprise CHALK, specifically that of the Holywell Nodular Chalk Formation and New Pit Chalk Formation (Undifferentiated).

2.6 Preliminary Engineering Assessment

The existing railway embankment is likely to have been constructed utilising locally sourced material and may comprise variable Made Ground. Due to the age of the railway line this is not likely to have been carried out to an engineering standard comparable to current methods or standards, however, also given the age of the embankment, long term settlement is likely to have ceased. In addition, the embankment is relatively low at the location of the proposed road/bridge.

No visual evidence of significant slope stability was noted in the existing embankments. The embankment are vegetated on both the northern and southern sides with some large shrubs and former trees also present on the embankments. It was noted the some trees had been recently felled prior to the fieldwork as part of continuing maintenance. Drainage culverts are present at the base of the embankments to allow surface runs off, one of which is visible to the west of the investigation area.

Evidence of burrows (possible rabbit warrens) were noted at several points along the railway embankment that may contribute to slope instability. Inspection of the burrows and arisings adjacent to the burrows showed grey brown silty sand which could be indicative of the existing embankment make up. Such burrowing may migrate to the new bridge embankment.

The underlying bedrock geology is expected to comprise Chalk strata which is potential soluble. Increased run off and drainage from the new road/bridge and surrounding developments could result in formation or propagation of solution features.

Minor cut and fill works are anticipated to be required in order to improve / prepare the sub grade with larger scale earthworks for formation of the embankment and bridge abutments.

2.7 Comparison of Project Options and Risks

Of the potential crossings currently under consideration Option 1 is considered likely to be most favourable due to the reduced height of embankments required at this point and lowest cost and foreseeable geotechnical risk.

2.8 Drawings and Photographs

The current proposed are shown on the Royal Haskoning DHV drawing No. PC3381-XXX-XX-XX-XX-X-0100 Rev P01 presented in **Appendix B**.

3.0 GROUND INVESTIGATION REPORT (GIR)

3.1 Existing Information

The following section carries on from the preceding sections and presents the Ground Investigation Report, discussing the findings and interpretation of Ground Investigation works undertaken in relation to the proposed permanent highway construction covered by this report.

3.2 Existing Information and Field and Laboratory Studies (Undertaken)

Site works undertaken by RSK Environment Limited and reported by WSP in 2020. The works carried out were located to the west of the currently proposed road (circa 150m west) however given the proximity of the investigation and the similarity of the formerly proposed scheme to the current Option 1, the works are considered to be potentially relevant and ground conditions may be referred to below when deemed to be pertinent. The previous works comprised the following;

- *Excavation of 8 No. machine excavated trial pits to depths of between 3.50m and 4.00m bgl.*
- *The drilling of 6 No. window sample boreholes to depths of between 2.25m to 5.45m bgl.*
- *The drilling of 4 No. rotary boreholes to depths of between 14.79m and 15.50m bgl.*
- *Undertaking of a Geophysical ERT Survey.*
- *Monitoring of standpipes installed within selected boreholes.*
- *Associated in-situ testing and laboratory testing undertaken on sample retrieved during the fieldworks.*

Shadbolt have recently undertaken targeted works in November / December 2023 along the route of a proposed road and bridge in order to confirm the ground conditions and to obtain appropriate samples for geotechnical analysis.

The fieldworks completed during the recent November / December 2023 ground investigation comprised;

- *Excavation of 10 No. machine excavated trial pits to depths of between 2.40m and 3.50m bgl.*
- *The drilling of 4 No. window sample boreholes to depths of between 1.85m to 3.45m bgl.*
- *The drilling of 4 No. rotary boreholes to depths of 15.50m bgl.*
- *Monitoring of standpipes installed within selected boreholes.*
- *Associated in-situ testing and laboratory testing undertaken on sample retrieved during the fieldworks*

The strata encountered is discussed below and the logs are presented in **Appendix C**.

3.2.1 Topsoil

Topsoil was encountered within all of the exploratory holes undertaken and was generally describes as grey/brown slightly sandy slightly gravelly CLAY with the gravel fraction comprising chalk and locally flint. Such Topsoil type material was typically encountered in thicknesses between 0.20m and 0.30m bgl.

3.2.2 Superficial Geology

Superficial deposits were typically encountered more consistently within the trial pits and window sample boreholes north of the railway line with soft light brown slightly sandy slightly gravelly CLAY recorded in trial pits TP-R1-01, TP-R1-02, TP-R1-05, TP-R1-06 and WS-R1-02 directly below the Topsoil and down to a maximum of 0.70m depth bgl.

A layer of light brown very sandy slightly gravelly CLAY was also encountered within TP-R1-10 at the southern end of the road route directly underlying the Topsoil between 0.30-0.45m bgl.

The above cohesive soils directly below the Topsoil are considered likely to be Head Deposits and are impersistent across the site.

Localised pockets of loose orange brown gravelly SAND were also noted within boreholes WS-R1-01 and WS-R1-02 at depths of 0.70-1.00m and 0.50-0.80m respectively, however these are considered likely to be pockets of weathered chalk as opposed to superficial deposits as similar pockets and lenses of orange brown sandy material was noted within the chalk elsewhere on site, the diagnostic feature being the orange brown colouration which is often associated with weathering of chalk strata.

3.2.1 Made Ground

No Made Ground soils were encountered within the exploratory points. Given that the area is arable land and is likely ploughed then all soils down to a depth of approximately 0.60m could be considered to be Made Ground Type Topsoil/subsoil as they have been disturbed by human activity at some point however given the lack of anthropogenic inclusions it is difficult to accurately distinguish between such slight anthropogenic disturbance and natural weathering of shallow soils.

3.2.3 Solid Geology

Solid geology of the White Chalk Subgroup was encountered across the site directly beneath the Topsoil and localised Superficial deposits.

The chalk strata were typically initially encountered as structureless white silty GRAVEL to depth of between 1.30m and 3.50 typically to greater depths to the south. Localised pockets of loose orange brown gravelly SAND were also noted within boreholes WS-R1-01 and WS-R1-02 at depths of 0.70-1.00m and 0.50-0.80m respectively. These sandy pockets are considered to be weathered out areas of the chalk strata as opposed to separate superficial deposits.

At depth the chalk typically comprised white locally mottled orange brown and speckled black weak low to medium, locally high-density CHALK with very closely to medium spaced horizontal (bedding) and steeply inclined / vertical fractures. The fractures were typically undulating rough tight clean with grey, brown and orange brown staining and black speckling.

At depth of between 8m and 13.70m light brown / cream sandy (gritty) weak low to medium density CHALK with wispy marl seams locally with a shaley texture and typically more closely spacing bedding fractures (locally with silty infill) was encountered and extended to the base of the boreholes.

The fractures, particularly those that are steeply inclined resulted in a heavy degree of disturbance along the fracture line resulting in some of the core lengths to disintegrate into fine to coarse gravel sized fragments. Such shattering of the core result can in some lengths of competent rock being recovered as non-intact core and can result in low SCR and RQD quotients, potentially not representative of the true

rock mass properties. In addition, such fracturing can obscure other fractures or stratigraphic features.

The base of the Chalk strata was not encountered within any of the exploratory holes the maximum depth of which was 15.50m bgl.

The ground conditions encountered are broadly consistent with those encountered and described in the previous WSP report outlining the ground investigation that was carried out to the east of the current site area.

3.2.4 Groundwater

No groundwater was encountered during the drilling of the 2020 works reported by WSP or during the 2023 works carried out by Shadbolt Group.

The WSP report does indicate that former BGS boreholes carried out to greater depth indicated groundwater at a depth of between 18.6-18.9m below ground level which is below the maximum depth scheduled in this investigation.

Groundwater monitoring of the standpipe installed within the rotary boreholes indicated standing water levels of between 10.72m and 15.29m depth bgl. The results of the monitoring are presented in full in **Appendix F**. It should be noted that groundwater conditions will vary seasonally and with changes in weather conditions along with several other factors including local discharges consents, abstraction licences permeability of the underlying deposits.

Exploratory Point	Ground Level (m AOD)	Depth to Groundwater Level on Stated Monitoring Date (m bgl)						
		17/11/23	07/12/23	09/01/24	25/01/24	07/02/24	TBC	TBC
RO-R1-01	71.05	DRY	14.12	11.65	10.72	10.79	TBC	TBC
RO-R1-02	72.40	DRY	15.29	13.00	11.92	12.05	TBC	TBC
RO-R1-03	71.77	Not yet installed	14.39	12.13	11.20	11.26	TBC	TBC
RO-R1-04	71.71	Not yet installed	14.56	11.91	10.92	10.99	TBC	TBC

3.2.5 Ground Obstructions

No significant ground obstructions were observed during the works. The chalk strata typically increased in strength and density at between circa 2-3m depth bgl with more structured chalk being encountered, in some cases with the chalk being beyond the ability of the plant utilised (10 tonne 360 tracked excavator with toothless bucket) to readily excavate.

3.2.6 Ground Conditions Summary

The new road and bridge are to be constructed to provide a link between the B656 / Royston Road in the south to Ashwell Road to the north and provide the proposed and existing developments with efficient access to the A505 and A1.

The strata underlying the proposed route comprises generally Topsoil over localised soft sandy/gravelly Clay to a maximum of 0.70m depth overlying natural Chalk bedrock. The chalk stratum is initially recovered as structureless silty GRAVEL with localised pockets of orange brown sand to depth of between 1.3-3.5m overlying structured white weak low to medium density Chalk becoming cream with a localised shaley texture from between 8-13m and extending to the base of the exploratory hole undertaken at 15.50m depth bgl.

3.2.9 Site Investigation In-situ and Laboratory Testing

The following in-situ and laboratory geotechnical testing was undertaken as part of the site investigation, the results of which are summarised in Table 3.2.9 (below) and presented on logs and laboratory reports in full in **Appendices C and E** respectively.

Method	Strata	Parameter	Comments
Atterberg Limits (1 No.)	Superficial (Head) 0.40m-0.50m	Liquid Limit 36% Modified Plasticity Index 12%	Near surface cohesive soils are Medium (single test only) Plasticity and Medium Volume Change Potential (single test only)
Particle Size Distribution (1 No.)	Superficial (Head) 0.40m-0.50m	Cobbles: 0% Gravel: 14% Sand: 38% Clay/Silt: 48%	Materials are typically a 2C (Stony Cohesive) material (SHW Series 600) and will be detrimentally affected by elevated moisture. (1 No. Slightly gravelly very sandy CLAY)
Compaction (Dry Density - Moisture Content Relationship) (2 No.)	Chalk 1.00m to 1.50m	Moisture Content as received was 23-28% Optimum Moisture Content is 19 to 21%	Materials ranged from 4% dry to 7% wet of optimum moisture content for earthworks (Average 5.5% Wet)
Standard Penetration Test (SPT) (15 No.)	Chalk 1.00m to 3.00m	SPT 'N-Values' in range N=19 to N=50 (Average N=41)	No correlations relating SPTs to chalk parameters or classifications.

CBR (Lab Remoulded) (2 No.)	Chalk 1.00m to 1.50m	Indicated CBR value of Chalk is <1% to 2.2%	Lab remoulded CBR tests indicate CBR of <1% to 2.2% It was noted that the chalk fragments required breaking to allow the test to be carried out which may impact the results. Based upon the SPTs values and in-situ description this is considered to be an underestimate of the in-situ CBR value. Further testing is outstanding.
Chalk Crush Value	Chalk 1.00m to 3.20m	Material Greater than 10mm = 21% to 55% (Average 36.6%) Moisture Content = 27% to 30% (Average 28%) Saturated Moisture Content = 25% to 31% (Average 27.3%) Chalk Crushing Value = 2.1 to 3.2 (Average 2.63)	Materials classified as Chalk Class A to C according to TRL LR806
Saturation Moisture Content and Intact Dry Density	Chalk 1.00m to 3.20m	Saturation Moisture Content = 25% to 31% (Average = 27%) Intact Dry Density = 1.47Mg/m ³ to 1.61Mg/m ³ (Average = 1.56 Mg/m ³)	Chalk is typically classified as Low to Medium density.
Point Load Tests	Chalk	TBC	TBC

Table 3.2.9 – Summary of In-Situ and Laboratory Geotechnical Testing undertaken.

Additional testing is currently outstanding, and the report will be updated upon receipt of the completed testing.

3.2.12 Contamination Testing

Shadbolt Group undertook an initial screen of the laboratory results using Shadbolt Group Tier One Screening Values Version (TSVs). This screening was undertaken using TSVs derived for the current and proposed Public Open Spaces (Residential) end use, which is considered to be appropriate / conservative for the grass verges of the embankment.

Contaminant concentrations below the TSVs are considered not to warrant further risk assessment. Concentrations of potential contaminants above the TSVs require further consideration of the potential pollutant linkages.

In total 6 No. soil samples were submitted for testing for a suite of common contaminants during the Shadbolt Group ground investigation. The laboratory chemical results have reported concentrations of potential contaminants to be within SE TSVs for 'Public Open Space' end use.

The water-soluble sulphate test results generally recorded concentrations between 11.5mg/l and 50.5mg/l. The soil pH was generally between 8.0 and 8.6 indicating slightly alkaline condition.

Sulphate levels and soil pH have been assessed and DS-1 and ACEC class 1 concrete is suitable for use at the site.

A copy of the laboratory reports is presented in **Appendix D**.

3.4 Ground Summary

Ground investigations undertaken along the length of the proposed route of Road Option 1 has confirmed a reasonably consistent geological profile, similar to that recorded previously of Topsoil over weathered structureless Chalk over structured fractured Chalk at depth. Groundwater was not identified during the field work with standing groundwater levels recorded at depth of between 10.72m and 15.29m bgl during subsequent monitoring. No significantly elevated concentrations of contaminants have been reported from soils retrieved from the site.

3.5 Geotechnical Risk Register

See Section 7

3.6 Engineering Assessment

See Section 4

4.0 GEOTECHNICAL DESIGN REPORT (GDR)

The GDR element of this report will be completed upon receipt of design documents for the proposed road and bridge.

5.0 CONCLUSIONS

6.0 REFERENCES

- Site walkover survey.
- Historical and Recent Ordnance Survey maps and plans.
- Geological Survey Sheets.
- The Environment Agency.
- Groundsure Report.
- British Geological Survey.
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- Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance April 2012.
- Ciria C733 Asbestos in soil and made ground: a guide to understanding and managing risks, March 2014.
- BRE Special Digest 1, 2005 (Third Edition). Concrete in aggressive ground. Construction Research Communications Ltd, Watford.
- BS 5930: 1999. Code of practice for site investigations. BSI, UK.
- BS 10175: 2011. Investigation of potentially contaminated sites – Code of Practice. BSI, UK.
- CIRIA C665: 2006. Assessing risks posed by hazardous ground gases to buildings. London UK.
- DD ENV, 1997. Eurocode 7: Geotechnical Design. Parts 1 to 3. BSI, UK.
- Environment Agency, 2008 - onwards, Science Reports SC050021 (SGVs)
- TOMLINSON, M.J., 2001 Foundation design and construction. Prentice Hall, London.
- The LQM/CIEH S4ULs for Human Health Risk Assessment (S4UL3251), November 2014
- The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations, September 2015.
- Rocscience Slide Software
- Rocscience Settle 3D Software

HIGHWAYS AGENCY STANDARDS AND INFORMATION

- DMRB CD622 Rev 1 – Managing Geotechnical Risk, Highways England.
- Manual of Contract Documents for Highway Works – Series 600 Earthworks

BRITISH AND EUROCODE STANDARDS

- BS 8002:2015, 'Code of practice for earth retaining structures', British Standards Institution.
- BS 6031:2009 Incorporating Corrigendum No. 1, 'Code of practice for earthworks', British Standards Institution.
- BSEN 1997-1:2004+A1:2013 Incorporating corrigendum February 2009, 'Eurocode 7: Geotechnical design – Part 1: General rules', British Standards Institution.
- BS EN 1997-2:2007 Incorporating corrigendum June 2010, 'Eurocode 7 – Geotechnical design – Part 2: Ground investigation and testing', British Standards Institution.
- NA+A1:2014 to BS EN 1997-1:2004+A1:2013 Incorporating Corrigendum No. 1, 'UK National Annex to Eurocode 7: Geotechnical Design – Part1: General rules', British Standards Institution.

7.0 GEOTECHNICAL RISK REGISTER

No	Hazard	Consequence	Phase of project affected	Risk Management Measures	Comments or further recommended actions	Risk
1	Soft and compressible ground	High differential and total settlements. Increased costs to dig out and replace soft / very soft soils or undertake ground improvement techniques.	Construction, design life	Ground investigations carried out and confirmed geological profile of Topsoil over localised soft CLAY over Chalk at typically <1m bgl. Near surface Topsoil/soft CLAY shall be removed. Earthworks to be undertaken to construct embankment to appropriate engineering design with confirmatory validation testing conducted during/post construction.	From Ground Investigations to date significant depths of compressible materials are not anticipated. Near surface Topsoil/Sub-soil shall be removed. Construction of the proposed embankment will require placement of suitable site won/imported material to a suitable specification with appropriate validation testing. Base-Ex level is to be proof rolled to identify any soft spots and materials excavated and replaced as required. The works will be supervised by a suitably qualified geo-environmental engineer.	Low
2	Flooding	Increased construction costs. Damage to structures, foundations and earthworks, including erosion of embankment slopes. Maintenance liability.	Excavations, earthworks, design life	Design will consider flood levels and fluctuations, including rapid drawdown. Ensure adequate temporary and permanent drainage for earthworks.	The site is located within a Flood Zone 1 – low risk. The underlying strata comprises chalk and is likely to be permeable with typically good drainage noted during the fieldworks. Flooding is not expected to present a risk to the highway construction; however, care should be taken during excavation works to ensure excessively wet materials are not incorporated into the engineered fill. During wet weather pumping or drainage cuts may be required to prevent pooling of surface water. The works will be supervised by a suitably qualified geo-environmental engineer.	Low
3	Aggressive ground conditions	Long term degradation of concrete components leading to reduced design life and increased maintenance costs.	Design life	Laboratory tests to determine aggressiveness of the ground. Design sulphate classifications for buried concrete to be assessed. Depending on sulphate concentration, avoid calcium-based additives to treat soils (i.e. lime, cement) or blend in non- plastic soils. Increase specification of concrete to higher class.	The results have been assessed in accordance with the guidance given in BRE Special Digest 1:2005. Assuming a brownfield site with mobile groundwater the concrete Design Sulphate Class for the site is DS-1, ACEC Class AC-1. Chemical testing will be undertaken during the works on the fill to be placed and the works will be supervised by a suitably qualified geo-environmental engineer.	Low
4	Shrinking / Swelling Potential	Changes in groundwater conditions as a result of the construction may cause shrinking or swelling of any high plasticity clays which may result in excessive movement of structures.	Design life	Geotechnical sampling and testing to assess plasticity of the strata below the site. Treatment with hydrated lime / cement, however this is dependent on sulphate concentration.	Limited cohesive soils are present on site. Laboratory analysis on the shallow cohesive materials has indicated soils to be of Intermediate Plasticity and Medium Volume Change potential. The natural underlying bedrock comprises of Chalk which is predominantly clast supported (Grade Dc) at shallow depth and structure chalk at depth, neither of which are expected to exhibit plastic behaviour.	Very low
5	Unexpected Ground Conditions	Unsuitable earthwork proposals if parameters assumed in the design are significantly different to those encountered on site during construction.	Design and construction works	GI has been undertaken and has confirmed soils are consistent and also consistent with those carried out by other previously.	Ground investigation have been undertaken at the site and a detailed ground model has been produced. However, should unexpected ground conditions be encountered NHC will be contacted immediately for comment. The works will be supervised by a suitably qualified geo-environmental engineer	Low
6	Instability of slopes on or adjacent to the proposed scheme	Failure of existing slopes and proposed embankment profile during construction.	Earthworks, Design life	Embankment and proposed slopes to be designed by appropriately qualified engineer. Validation testing of embankment fill to be carried out during construction to confirm placed material meets appropriate criteria / specifications. Possible ground investigation to confirm stability of existing railway embankment.	A ground investigation had been carried out along the current proposed road/bridge route. Should the route be altered further confirmatory investigations may be required. Confirmation of the composition and stability of the existing railway embankment may be prudent dependent upon the expected interaction between it and the proposed road embankment. The ground investigation data should be utilised to design an appropriate earthworks specification and validation strategy for the proposed embankment and road design. Geotechnical validation testing will be undertaken during the works as described within the strategy in order to ensure that the works are undertaken appropriately, and these works will be supervised by a suitably qualified geo-environmental engineer.	Low
7	Hard ground or obstructions	Delay site works, Increased construction costs.	Excavations, foundations	GI has been undertaken to confirm ground conditions along currently proposed route. Bedrock strata increased in density around 2-3m depth. No works have yet been carried out to confirm the make up of the railway embankment. This may be required should interaction between the existing railway embankment and the new road embankment be anticipated.	Obstructions may be associated with Made Ground and natural solid geology. Ground conditions of the existing railway embankment not yet confirmed. The works will be supervised by a suitably qualified geo-environmental engineer	Low
8	UXO	Delay site works, Increased construction costs.	Excavations, foundations	UXO bomb mapping indicates LOW Risk with no UXO identified within the area.	The works will be supervised by a suitably qualified geo-environmental engineer. Should UXO be encountered (unlikely) a suitably qualified UXO engineer will be contacted for further assessment.	Very Low

APPENDIX A

REPORT CONDITIONS

REPORT CONDITIONS

This report is produced for the benefit of **Urban and Civic** in accordance with the terms of the appointment.

This report has been prepared in accordance with the terms and conditions of the appointment and relates to the condition of the site at the time of ground investigations. No warranty is provided as to the possibility of future changes in the condition of the site.

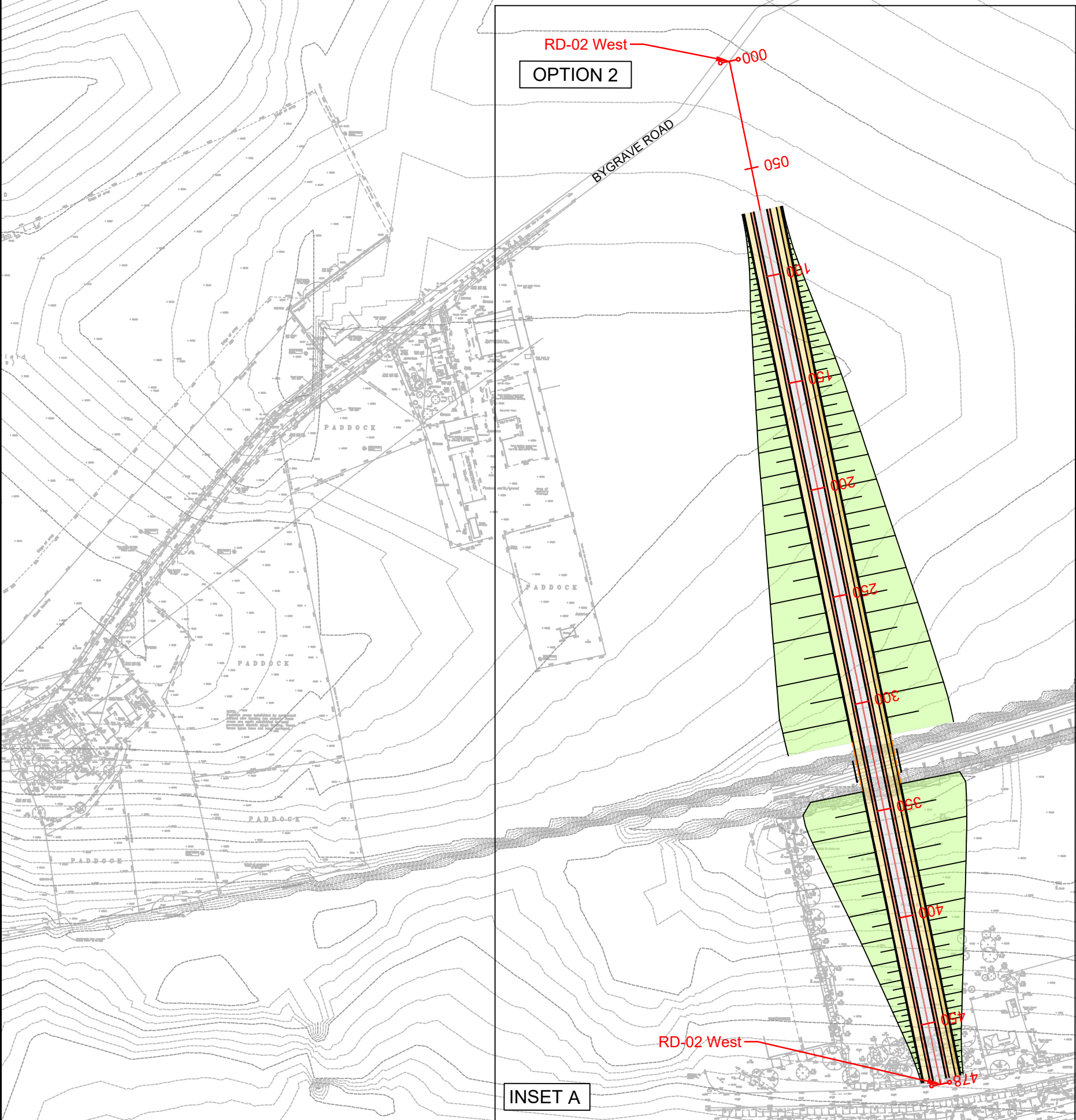
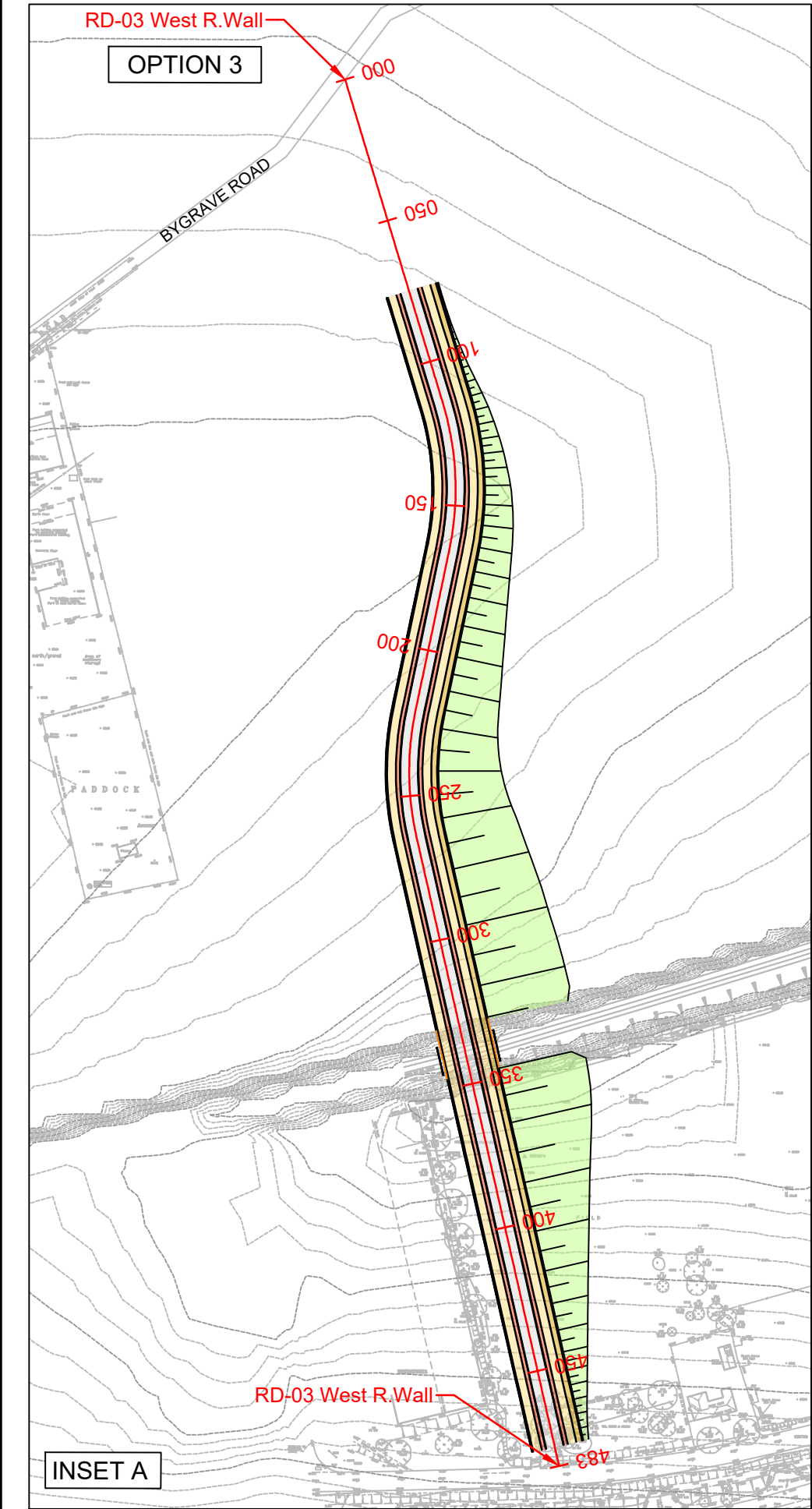
Shadbolt Group takes no responsibility for conditions which occur between the individual exploratory holes. Whilst every effort has been made to interpret the conditions between investigation locations, such information is only indicative.

Whilst the contamination assessment detailed within this report reflects our view, because there are no exact UK definitions of these matters, being subject to risk analysis, Shadbolt Environmental are unable to give categoric assurances that they will be accepted by authorities or funds without question. This report is prepared and written for the purposed uses stated in the report and should not be used in a different context without reference to Shadbolt Environmental. In time, improved practices or amended legislation may necessitate a re-assessment.

The report is limited to the geotechnical and environmental aspects detailed within the report, and is necessarily restricted and no liability is accepted for any other aspect especially concerning gradual or sudden pollution incidents.

APPENDIX B

DRAWINGS



NOTES

KEY:

ALIGNMENT POSITION

ROAD

CYCLEWAY

FOOTWAY

BRIDLEWAY

VERGE

EMBANKMENT

P01	12/10/23	FIRST ISSUE	KZ	LZ	DJ
REV	DATE	DESCRIPTION	BY	CHK	APP

REVISIONS

DRAWING STATUS

CLIENT

PROJECT

BALDOCK RAILWAY CROSSING

TITLE

LOCATION PLAN

Royal HaskoningDHV
Enhancing Society Together

Portland Street,
Manchester One, 9th Floor
Manchester, M1 3LF
Tel +44(0)161 2361018
Email info.manchester@uk.rdhv.com
Website www.royalhaskoning.com

DRAWN	KZ	CHECKED	LZ	APPROVED	DJ
DATE	SEP 23	SCALE AT A1	1:2000	PROJECT NUMBER	PC3381
DRAWING No.	PC3381-XXX-XX-XX-XX-X-0100			SUITABILITY	REVISION
					P01

APPENDIX C

LOGS

Project Id: 2899
Project Title: Baldock
Location: Baldock, North Hertfordshire
Client: Urban & Civic

Title: Site Plan
Scale: 1:2000
Engineer: Stephen J Fisk
Contractor:



Legend Key

Locations By Type - Empty

Locations By Type - RC

Locations By Type - TP

Locations By Type - WLS

Locations By Type - WS





Rotary Core Log

Borehole No.

RO-R1-01

Sheet 1 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 525980.26 - 234735.48

Location: Baldock, North Hertfordshire

Level: 71.05

Client: Urban & Civic

Dates: 15/11/2023

Scale
1:25

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description		
				TCR	SCR	RQD						
							0.30	70.75		TOPSOIL: Brown slightly sandy slightly gravelly CLAY. Gravel is angular to sub-angular fine to coarse chalk.		
							0.40	70.65		Soft light brown slightly sandy slightly gravelly CALY. Gravel is angular to sub-rounded chalk. Structureless CHALK composed of white weak medium to high density coarse sub-angular to sub-rounded GRAVEL of CHALK.		
		N=47 (5,8/10,12,11,14) 1.20 - 2.00								Non-intact between 1.2m and 1.72m	1	
				1	0	0	1.72	69.33		Assessed Zone of Core Loss.		
		2.00 - 3.50					2.00	69.05		White weak low to medium density CHALK with core disturbance due to vertical/steeply inclined fractures. Bedding fractures are very close to closely spaced undulating rough tight clean. Vertical/inclined joint are closed, undulating rough, clean with localised light grey and orange brown staining. Non-intact between 2m and 2.57m	2	
				1	0	0						
		3.50 - 5.00					3.40	67.65		Assessed Zone of Core Loss.	3	
							3.50	67.55		White weak low to medium density CHALK with core disturbance due to vertical/steeply inclined fractures. Bedding fractures are very close to closely spaced undulating rough tight clean. Vertical/inclined joint are closed, undulating rough, clean with localised light grey and orange brown staining. Non-intact between 3.5m and 4.5m		

Remarks

No groundwater identified





Rotary Core Log

Borehole No.

RO-R1-01

Sheet 2 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 525980.26 - 234735.48

Location: Baldock, North Hertfordshire

Level: 71.05

Client: Urban & Civic

Dates: 15/11/2023

Scale
1:25

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.50								White weak low to medium density CHALK with core disturbance due to vertical/steeply inclined fractures. Bedding fractures are very close to closely spaced undulating rough tight clean. Vertical/inclined joint are closed, undulating rough, clean with localised light grey and orange brown staining.	6
		6.50 - 8.00									7
		8.00 - 9.50									8
											9
										Continued on Next Sheet	10

Remarks
No groundwater identified



Rotary Core Log

Borehole No.

RO-R1-01

Sheet 3 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 525980.26 - 234735.48

Location: Baldock, North Hertfordshire

Level: 71.05

Scale
1:25

Client: Urban & Civic

Dates: 15/11/2023

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00					11.00	60.05		White weak low to medium density CHALK with core disturbance due to vertical/steeply inclined fractures. Bedding fractures are very close to closely spaced undulating rough tight clean. Vertical/inclined joint are closed, undulating rough, clean with localised light grey and orange brown staining.	
		11.00 - 12.50								Cream slightly sandy weak medium density CHALK with occasional wispy marl bands and with core disturbance along vertical/steeply inclined fractures. Bedding fractures are extremely close to closely spaced undulating rough tight clean to partly open with cream silt matrix infill. Vertical/inclined joint are closed, undulating rough, clean. <i>Non-intact between 11m and 11.2m</i> <i>Non-intact between 11.6m and 11.8m</i>	11
										<i>Non-intact between 12.35m and 12.5m</i> <i>Non-intact between 12.5m and 12.65m</i>	12
		12.50 - 14.00					12.85	58.20		Non-intact Core Recovery: Cream and light brown weak medium density marly CHALK.	13
		14.00 - 15.50					14.00	57.05		Cream slightly sandy weak medium density CHALK with occasional wispy marl bands and with core disturbance along vertical/steeply inclined fractures. Bedding fractures are extremely close to closely spaced undulating rough tight clean to partly open with cream silt matrix infill. Vertical/inclined joint are closed, undulating rough, clean. <i>Non-intact between 14m and 14.25m</i> <i>Non-intact between 14.35m and 14.8m</i>	14
										Continued on Next Sheet	15

Remarks

No groundwater identified





Rotary Core Log

Borehole No.

RO-R1-01

Sheet 4 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 525980.26 - 234735.48

Location: Baldock, North Hertfordshire

Level: 71.05

Scale
1:25

Client: Urban & Civic

Dates: 15/11/2023

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
							15.30	55.75		Cream slightly sandy weak medium density CHALK with occasional wispy marl bands and with core disturbance along vertical/steeply inclined fractures. Bedding fractures are extremely close to closely spaced undulating rough tight clean to partly open with cream silt matrix infill. Vertical/inclined joint are closed, undulating rough, clean. <i>Non-intact between 15.1m and 15.3m</i> Assessed Zone of Core Loss. End of Borehole at 15.50m	16
							15.50	55.55			17
											18
											19
											20

Remarks
No groundwater identified





Rotary Core Log

Borehole No.

RO-R1-02

Sheet 1 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 526035.85 - 234749.69

Location: Baldock, North Hertfordshire

Level: 72.40

Scale
1:25

Client: Urban & Civic

Dates: 14/11/2023

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		N=38 (4,6/10,8,9,11) 1.20 - 2.00					0.30	72.10		TOPSOIL: Brown slightly sandy slightly gravelly CLAY. Gravel is angular to sub-angular fine to coarse chalk.	1
							0.40	72.00		Soft light brown slightly sandy slightly gravelly CALY. Gravel is angular to sub-rounded chalk. Structureless CHALK composed of white locally speckled black weak high density coarse sub-angular GRAVEL of CHALK.	
										Non-intact between 1.2m and 1.3m.	
										Assessed Zone of Core Loss.	
										White locally speckled black very weak medium density CHALK with core disturbance due to vertical/steeply inclined fractures. Bedding fractures are very closely to closely spaced undulating rough, tight clean. Vertical / steeply inclined fractures are undulating rough tight clean with localised orange brown/brown staining and black speckling.	
										... single black flint observed at 2.94m.	
										... with black speckling on joint surfaces from 3.50m.	
										... with light orange brown staining from 4.60m.	
										Continued on Next Sheet	

Remarks
No groundwater identified





Rotary Core Log

Borehole No.

RO-R1-02

Sheet 2 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 526035.85 - 234749.69

Location: Baldock, North Hertfordshire

Level: 72.40

Scale
1:25

Client: Urban & Civic

Dates: 14/11/2023

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.50		100	15	15	6.30	66.10		White slightly stained orange brown weak medium to high density CHALK with core disturbance due to vertical/steeply inclined fractures. Bedding fractures are very closely to closely spaced undulating rough, tight clean. Vertical /steeply inclined fractures are undulating rough tight clean with localised orange brown/brown staining and black speckling.	6
							6.50	65.90		Non-intact Core Recovery: White silty fine to coarse angular GRAVEL of weak low density chalk.	
		6.50 - 8.00		100	33	33	7.12	65.28		White slightly stained orange brown weak medium to high density CHALK. Bedding fractures are very closely to closely spaced undulating rough, tight clean with light grey staining.	7
							8.00	64.40		White locally speckled black very weak medium density CHALK. Bedding fractures are very closely to closely spaced undulating rough.	
										... with orange brown staining from 7.80m.	
		8.00 - 9.50		99	0	0	9.34	63.06		White occasionally mottled orange brown weak low to medium density CHALK with some core disturbance along vertical/steeply inclined fractures. Bedding fractures are very closely to closely spaced undulating rough, tight clean. Vertical/steeply inclined fractures are undulating rough tight clean with some light grey brown staining.	8
							9.48	62.92		Non Intact Core Recovery: White silty angular fine to coarse GRAVEL of weak low density CHALK.	
							9.50	62.90		Assessed Zone of Core Loss.	
										White mottled orange brown weak medium density CHALK with some core disturbance due to steeply inclined fractures. Inclined fractures are undulating rough tight clean.	
										Non-intact between 9.65m and 10.4m.	10

Continued on Next Sheet

Remarks

No groundwater identified





Rotary Core Log

Borehole No.

RO-R1-02

Sheet 3 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 526035.85 - 234749.69

Location: Baldock, North Hertfordshire

Level: 72.40

Scale
1:25

Client: Urban & Civic

Dates: 14/11/2023

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00		99	0	0	10.98 11.00 				

Remarks
No groundwater identified





Rotary Core Log

Borehole No.

RO-R1-02

Sheet 4 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 526035.85 - 234749.69

Location: Baldock, North Hertfordshire

Level: 72.40

Scale
1:25

Client: Urban & Civic

Dates: 14/11/2023

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
							15.36	57.04		Non-intact Core Recovery: Light brown mottled orange brown angular medium to coarse GRAVEL of weak medium to high density chalk.	
							15.50	56.90		Assessed Zone of Core Loss.	
										End of Borehole at 15.50m	

Remarks
No groundwater identified





Rotary Core Log

Borehole No.

RO-R1-03

Sheet 1 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 526021.13 - 234672.39

Location: Baldock, North Hertfordshire

Level: 71.77

Client: Urban & Civic

Dates: 28/11/2023

Scale
1:25

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
							0.30	71.47		TOPSOIL: Brown slightly sandy slightly gravelly CLAY. Gravel is angular to sub-angular fine to coarse chalk.	
										Structureless CHALK composed of white rare speckled black and mottled orange brown silty GRAVEL of angular medium to high density chalk.	
		N=22 (3,7/4,4,8,6)									1
		1.20 - 2.00		94	0	0					
							1.95 2.00	69.82 69.77		Assessed Zone of Core Loss. Non-intact Core Recovery: Structureless CHALK recovered as white rare speckled black and mottled orange brown silty GRAVEL of angular medium to high density chalk.	2
		2.00 - 3.50		100	45	0	2.74 2.75	69.03 69.02		Grey brown MARL seam. White locally speckled black weak medium density CHALK with core disturbance due to vertical/steeply inclined fractures. Bedding fractures are very closely to closely spaced undulating rough tight clean. Inclined fractures are undulating rough tight clean locally with light brown/orange brown staining.	3
		3.50 - 5.00		100	0	0					4
											5
Continued on Next Sheet											

Remarks

No groundwater identified





Rotary Core Log

Borehole No.

RO-R1-03

Sheet 2 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 526021.13 - 234672.39

Location: Baldock, North Hertfordshire

Level: 71.77

Scale
1:25

Client: Urban & Civic

Dates: 28/11/2023

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.50		90	76	7	6.35	65.42		White locally speckled black weak medium density CHALK with core disturbance due to vertical/steeply inclined fractures. Bedding fractures are very closely to closely spaced undulating rough tight clean. Inclined fractures are undulating rough tight clean locally with light brown/orange brown staining. <i>Non-intact between 5.22m and 6.35m</i>	6
							6.50	65.27		Assessed Zone of Core Loss.	
		6.50 - 8.00		100	80	80				White locally speckled black weak medium density CHALK with core disturbance due to vertical/steeply inclined fractures. Bedding fractures are very closely to closely spaced undulating rough tight clean. Inclined fractures are undulating rough tight clean locally with light brown/orange brown staining. <i>Non-intact between 7.7m and 8m</i>	7
		8.00 - 9.50		98	91	47					
							9.47	62.30		Assessed Zone of Core Loss.	9
							9.50	62.27		Non-intact Core Recovery: White mottled light brown grey sub-angular fine to coarse GRAVEL of weak medium density chalk..	
							9.62	62.15		White locally speckled black sandy weak medium density CHALK with core disturbance due to vertical/steeply inclined fractures. Bedding fractures are closely to medium spaced, rough undulating, tight to moderately wide (possibly due to drilling disturbance) with silty gravel fill and grey brown/orange brown staining and black speckling. Inclined fractures are undulating rough tight clean with light brown/orange brown staining and black speckling.	10

Continued on Next Sheet

Remarks
No groundwater identified





Rotary Core Log

Borehole No.

RO-R1-03

Sheet 3 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 526021.13 - 234672.39

Location: Baldock, North Hertfordshire

Level: 71.77

Scale
1:25

Client: Urban & Civic

Dates: 28/11/2023

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00		100	79	70	12.50	59.27		White locally speckled black sandy weak medium density CHALK with core disturbance due to vertical/steeply inclined fractures. Bedding fractures are closely to medium spaced, rough undulating, tight to moderately wide (possibly due to drilling disturbance) with silty gravel fill and grey brown/orange brown staining and black speckling. Inclined fractures are undulating rough tight clean with light brown/orange brown staining and black speckling.	11
		11.00 - 12.50		100	70	61				<u>Non-intact between 11m and 11.35m</u>	12
										<u>Non-intact between 12.3m and 12.5m</u>	13
										Cream weak medium density CHALK. Bedding fractures are very closely to medium spaced undulating rough tight. Inclined fractures are undulating rough tight clean locally with light brown staining. <u>Non-intact between 12.5m and 12.74m</u>	
		12.50 - 14.00		96	67	0				<u>Non-intact between 13.5m and 13.59m</u> <u>Non-intact between 13.74m and 13.8m</u>	14
14.00 - 15.50	93	57	0	Assessed Zone of Core Loss. Cream weak medium density CHALK with very closely to medium spaced moderately wide grey brown marl seams. Bedding fractures are very closely to medium spaced undulating rough tight. Inclined fractures are undulating rough occasionally striated tight clean locally with grey and orange brown staining. <u>Non-intact between 14m and 14.15m</u> <u>Non-intact between 14.55m and 14.92m</u>							
				13.94 14.00	57.83 57.77	Continued on Next Sheet	15				

Remarks
No groundwater identified





Rotary Core Log

Borehole No.

RO-R1-03

Sheet 4 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 526021.13 - 234672.39

Location: Baldock, North Hertfordshire

Level: 71.77

Scale
1:25

Client: Urban & Civic

Dates: 28/11/2023

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description					
				TCR	SCR	RQD									
							15.40	56.37		Cream weak medium density CHALK with very closely to medium spaced moderately wide grey brown marl seams. Bedding fractures are very closely to medium spaced undulating rough tight. Inclined fractures are undulating rough occasionally striated tight clean locally with grey and orange brown staining.					
		15.50		56.27											
Assessed Zone of Core Loss.											16				
End of Borehole at 15.50m															
												17			
											18				
											19				
											20				

Remarks

No groundwater identified





Rotary Core Log

Borehole No.

RO-R1-04

Sheet 1 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 526060.70 - 234690.94

Location: Baldock, North Hertfordshire

Level: 71.71

Scale
1:25

Client: Urban & Civic

Dates: 27/11/2023

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description									
				TCR	SCR	RQD													
		N=19 (3,3/4,3,5,7)					0.30	71.41		TOPSOIL: Brown slightly sandy slightly gravelly CLAY. Gravel is angular to sub-angular fine to coarse chalk.	1								
										Structureless CHALK composed of white rare speckled black and mottled orange brown silty GRAVEL of angular medium to high density chalk.									
															Non-intact Core Recovery: Black and white coarse sub-rounded flint GRAVEL.				
																			Non-intact Core Recovery: Structureless CHALK composed of white mottled orange brown silty angular to sub-angular fine to coarse GRAVEL of weak medium dense chalk and black flint.
		1.20		70.51				Non-intact Core Recovery: Structureless CHALK composed of white mottled orange brown silty angular to sub-angular fine to coarse GRAVEL of weak medium dense chalk and black flint.											
		1.30		70.41															
		1.44		70.27															
		1.20 - 2.00		30	0	0													
		2.00 - 3.50		94	32	0	2.00	69.71		White to cream weak medium to high density CHALK with core disturbance due to vertical/ steeply inclined fractures. Bedding fractures are very closely to closely spaced undulating rough tight clean with slight brown/grey staining. Inclined fractures are undulating rough tight clean with slight brown/grey staining.	2								
										Non-intact between 2.0m and 2.30m									
										Non-intact between 2.70m and 3.41m									
										... slightly mottled orange brown from 3.25m.									
							3.41	68.30		Assessed Zone of Core Loss.									
		3.50 - 5.00		100	87	0	3.50	68.21		White weak medium to high density CHALK with core disturbance due to vertical/steeply inclined fractures. Bedding fractures are very closely to closely spaced undulating rough tight clean with slight brown/grey staining. Inclined fractures are undulating rough tight clean with slight brown/grey staining.	4								
										... very closely spaced marl seams of 2mm thickness.									
Continued on Next Sheet											5								

Remarks
No groundwater identified





Rotary Core Log

Borehole No.

RO-R1-04

Sheet 2 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 526060.70 - 234690.94

Location: Baldock, North Hertfordshire

Level: 71.71

Scale
1:25

Client: Urban & Civic

Dates: 27/11/2023

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.50		100	0	0				White weak medium to high density CHALK with core disturbance due to vertical/steeply inclined fractures. Bedding fractures are very closely to closely spaced undulating rough tight clean with slight brown/grey staining. Inclined fractures are undulating rough tight clean with slight brown/grey staining.	6
		6.50 - 8.00		100	0	0					
		8.00 - 9.50		67	0	0					
							8.00	63.71		Non-intact Core Recovery: Cream with orange brown staining slightly sandy angular fine to coarse GRAVEL of weak medium density chalk.	8
							9.00	62.71		Assessed Zone of Core Loss.	9
							9.50	62.21		Cream slightly sandy weak medium density CHALK with closely spaced wispy marl seams and core disturbance due to vertical/steeply inclined fractures. Bedding fractures are extremely closely to closely spaced undulating rough tight clean to partly open with silt infill. Inclined fractures are undulating rough tight clean with orange brown staining and black speckling.	10
										Non-intact between 9.65m and 10.15m.	
										Continued on Next Sheet	

Remarks
No groundwater identified





Rotary Core Log

Borehole No.

RO-R1-04

Sheet 3 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 526060.70 - 234690.94

Location: Baldock, North Hertfordshire

Level: 71.71

Scale
1:25

Client: Urban & Civic

Dates: 27/11/2023

Logged By
SJF

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00		100	0	0				Cream slightly sandy weak medium density CHALK with closely spaced wispy marl seams and core disturbance due to vertical/steeply inclined fractures. Bedding fractures are extremely closely to closely spaced undulating rough tight clean to partly open with silt infill. Inclined fractures are undulating rough tight clean with orange brown staining and black speckling. <i>Non-intact between 10.50m and 11.00m.</i> <i>... frequent marl seams from 10.90m.</i>	11
		11.00 - 12.50		100	0	0				<i>Non-intact between 11.35m and 11.85m.</i>	12
		12.50 - 14.00		85	0	0				<i>Non-intact between 12.20m and 12.50m.</i> <i>Non-intact between 12.50m and 13.50m.</i>	13
		14.00 - 15.50		100	0	0				Assessed Zone of Core Loss.	14
							13.77	57.94		Cream slightly sandy weak medium density CHALK with closely spaced wispy marl seams and core disturbance due to vertical/steeply inclined fractures. Bedding fractures are extremely closely to closely spaced undulating rough tight clean to partly open with silt infill. Inclined fractures are undulating rough tight clean with orange brown staining and black speckling. <i>Non-intact between 14.30m and 14.80m.</i>	15
							14.00	57.71			
Continued on Next Sheet											

Remarks
No groundwater identified





Borehole No.

RO-R1-04

Sheet 4 of 4

Hole Type
RC

Project Name: Baldock

Project No.
2899

Co-ords: 526060.70 - 234690.94

Location: Baldock, North Hertfordshire

Level:	71.71
--------	-------

Scale

1:25

Client: Urban & Civic

Dates: 27/11/2023

Logged By
SJF

20

Remarks

No groundwater identified





Trial Pit Log

Trial Pit No
TP-R1-01
Sheet 1 of 1

Project Name: Baldock	Project No. 2899	Co-ords: 525845.85 - 234926.89 Level: 72.51	Date 13/11/2023
Location: Baldock, North Hertfordshire		Dimensions (m): 0.50 Depth 3.50	Scale 1:20
Client: Urban & Civic			Logged RK

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10 - 0.15	ES		0.20	72.31		Brown friable slightly sandy slightly gravelly clayey TOPSOIL. Gravel is angular to sub angular fine to coarse chalk.	
	0.40 - 0.50	B					TOPSOIL Soft light brown friable slightly sandy slightly gravelly CLAY. Gravel is angular to sub angular fine to coarse of chalk.	
	1.00 - 1.20	D		0.70	71.81		Structureless CHALK recovered as slightly sandy slightly clayey sub angular to angular mainly fine to coarse GRAVEL. Gravel is extremely weak to weak low density cream. Matrix is uncompact light brown..	1
	1.70 - 1.80	D		1.30	71.21		Structureless CHALK composed of sub angular to angular mainly medium to coarse GRAVEL with high cobble content. Gravel is weak to moderately weak medium density cream. Matrix is uncompact cream. Cobbles are weak to medium strong low to medium density cream.	2
	2.80 - 3.00	D						3
				3.50	69.01		End of Pit at 3.50m	4

Remarks: No groundwater encountered.

Stability: Stable
Plant: 10T tracked excavator





Trial Pit Log

TrialPit No
TP-R1-02
Sheet 1 of 1

Project Name: Baldock	Project No. 2899	Co-ords: 525889.94 - 234880.95 Level: 72.45	Date 13/11/2023
Location: Baldock, North Hertfordshire		Dimensions (m): 3.00 Depth 3.20	Scale 1:20
Client: Urban & Civic			Logged RK

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10 - 0.15	ES		0.20	72.25		Brown friable slightly sandy slightly gravelly clayey TOPSOIL. Gravel is angular to sub angular fine to coarse chalk.	
	0.40 - 0.50	D		0.50	71.95		TOPSOIL Soft light brown friable slightly sandy slightly gravelly CLAY. Gravel is angular to sub angular fine to coarse chalk occasional flint.	
	1.00 - 1.20	B		1.30	71.15		Structureless CHALK recovered as slightly sandy slightly clayey sub angular to angular mainly fine to coarse GRAVEL. Gravel is extremely weak to weak low density cream. Matrix is uncompact light brown..	1
	1.50 - 1.60	D					Structureless CHALK composed of sub angular to angular mainly medium to coarse GRAVEL with high cobble content. Gravel is weak to moderately weak medium density cream. Matrix is uncompact cream. Cobbles are weak to medium strong low to medium density cream.	2
	2.80 - 3.00	D		3.20	69.25		End of Pit at 3.20m	3
								4

Remarks: No groundwater encountered.

Stability: Stable
Plant: 10T tracked excavator





Trial Pit Log

TrialPit No
TP-R1-03
Sheet 1 of 1

Project Name: Baldock	Project No. 2899	Co-ords: 525937.08 - 234829.56 Level: 71.83	Date 13/11/2023
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Location: Baldock, North Hertfordshire	Dimensions (m): 3.00	Scale 1:20
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Client: Urban & Civic	Depth 3.20	Logged RK
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10 - 0.15	B		0.30	71.53		Brown friable slightly sandy slightly gravelly clayey TOPSOIL. Gravel is angular to sub angular fine to coarse chalk. TOPSOIL	1
	0.40 - 0.50	ES					Structureless CHALK recovered as slightly sandy slightly clayey sub angular to angular mainly fine to coarse GRAVEL. Gravel is extremely weak to weak low density cream. Matrix is uncompact light brown..	
	0.90 - 1.00	D		1.20	70.63		Structureless CHALK composed of sub angular to angular mainly medium to coarse GRAVEL with high cobble content. Gravel is weak to moderately strong low to medium density cream. Matrix is uncompact cream. Cobbles are weak to medium strong low to medium density cream.	2
	2.00 - 2.20	D						
				3.20	68.63		End of Pit at 3.20m	3
								4

Remarks: No groundwater encountered.

Stability: Stable
Plant: 10T tracked excavator





Trial Pit Log

TrialPit No
TP-R1-04
Sheet 1 of 1

Project Name: Baldock	Project No. 2899	Co-ords: 525974.54 - 234784.09 Level: 72.01	Date 13/11/2023
Location: Baldock, North Hertfordshire		Dimensions (m): 3.00 Depth 3.40	Scale 1:20
Client: Urban & Civic			Logged RK

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10 - 0.15	ES		0.30	71.71		Brown friable slightly sandy slightly gravelly clayey TOPSOIL. Gravel is angular to sub angular fine to coarse chalk. TOPSOIL	
	0.60 - 0.70	B		0.70	71.31		Structureless CHALK recovered as slightly sandy slightly clayey sub angular to angular mainly medium to coarse GRAVEL. Gravel is very weak to weak low density cream. Matrix is uncompact light brown.	
	1.00 - 1.20	D					Structureless CHALK composed of sub angular to angular mainly medium to coarse GRAVEL with high cobble content. Gravel is weak to medium strong low to medium density cream. Cobbles are weak to medium strong low to medium density cream.	1
	1.50 - 1.70	D						2
	3.00 - 3.20	B						3
				3.40	68.61		End of Pit at 3.40m	4

Remarks: No groundwater encountered.	
Stability: Stable	
Plant: 10T tracked excavator	



Trial Pit Log

TrialPit No
TP-R1-05
Sheet 1 of 1

Project Name: Baldock	Project No. 2899	Co-ords: 525984.49 - 234746.65 Level: 71.51	Date 13/11/2023
Location: Baldock, North Hertfordshire		Dimensions (m): 3.00 Depth 3.40	Scale 1:20 Logged RK
Client: Urban & Civic			

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10 - 0.15	D		0.30	71.21		Brown friable slightly sandy slightly gravelly clayey TOPSOIL. Gravel is angular to sub angular fine to coarse chalk. TOPSOIL	
	0.50 - 0.60	ES		0.60	70.91		Soft light brown friable slightly sandy slightly gravelly CLAY. Gravel is angular to sub angular fine to coarse chalk and occasional flint.	
	1.00 - 1.20	B		1.10	70.41		Structureless CHALK recovered as slightly sandy slightly clayey sub angular to angular mainly medium to coarse GRAVEL. Gravel is very weak to weak low density cream. Matrix is uncompact light brown.	1
	2.60	D		3.40	68.11		Structureless CHALK composed of sub angular to angular mainly medium to coarse GRAVEL with high cobble content. Gravel is weak to medium strong low to medium density white. Matrix is uncompact cream. Cobbles are weak to medium strong low to medium density cream.	2
							End of Pit at 3.40m	3
								4

Remarks: No groundwater encountered.	
Stability: Stable	
Plant: 10T tracked excavator	



Trial Pit Log

Trial Pit No
TP-R1-06
Sheet 1 of 1

Project Name: Baldock	Project No. 2899	Co-ords: 526020.91 - 234761.33 Level: 72.38	Date 13/11/2023
Location: Baldock, North Hertfordshire		Dimensions (m): 3.00 Depth 3.00	Scale 1:20
Client: Urban & Civic			Logged RK

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10 - 0.15	B					Brown friable slightly sandy slightly gravelly clayey TOPSOIL. Gravel is angular to sub angular fine to coarse chalk. TOPSOIL	
	0.40 - 0.50	ES		0.30	72.08		Soft light brown friable slightly sandy slightly gravelly CLAY. Gravel is angular to sub rounded of chalk.	
				0.50	71.88		Structureless CHALK composed of sub angular to angular mainly medium to coarse GRAVEL with high cobble content. Gravel is very weak to weak low to medium density white. Matrix is uncompact cream. Cobbles are weak to medium strong low to medium density cream.	
	1.40 - 1.50	D						1
	2.50 - 2.60	B						2
				3.00	69.38		End of Pit at 3.00m	3
								4

Remarks: No groundwater encountered.

Stability: Stable
Plant: 10T tracked excavator





Trial Pit Log

TrialPit No
TP-R1-07
Sheet 1 of 1

Project Name: Baldock	Project No. 2899	Co-ords: 526039.57 - 234655.81 Level: 72.45	Date 28/11/2023
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Location: Baldock, North Hertfordshire	Dimensions (m): 2.60 0.75	Scale 1:20
Client: Urban & Civic	Depth 2.50	Logged RP

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.30	72.15		TOPSOIL: Grey friable slightly sandy slightly gravelly CLAY. Gravel is fine to medium of sub angular chalk and angular flint.	
	1.50	B		2.50	69.95		Cream clayey structureless CHALK. Recovered as fine to coarse angular gravel with occasional cobbles and orangish brown staining of fissures.	1 2 3 4
							End of Pit at 2.50m	

Remarks: No groundwater encountered.	
Stability: Stable	
Plant: 10T tracked excavator	



Trial Pit Log

TrialPit No
TP-R1-08
Sheet 1 of 1

Project Name: Baldock	Project No. 2899	Co-ords: 526063.32 - 234627.79 Level: 73.17	Date 28/11/2023
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Location: Baldock, North Hertfordshire	Dimensions (m): 2.70 0.75	Scale 1:20
Client: Urban & Civic	Depth 2.80	Logged RP

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.15	ES		0.30	72.87		TOPSOIL: Grey friable slightly sandy slightly gravelly CLAY. Gravel is fine to medium of sub angular chalk and angular flint.	
	1.00	B					Cream clayey structureless CHALK. Recovered as fine to coarse angular gravel with occasional cobbles and orangish brown staining of fissures.	1
	2.00	D						2
				2.80	70.37		End of Pit at 2.80m	3
								4

Remarks: No groundwater encountered.	
Stability: Stable	
Plant: 10T tracked excavator	



Trial Pit Log

Trial Pit No
TP-R1-09
Sheet 1 of 1

Project Name: Baldock	Project No. 2899	Co-ords: 526056.95 - 234587.41 Level: 72.99	Date 28/11/2023
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Location: Baldock, North Hertfordshire	Dimensions (m): 2.50 0.75	Scale 1:20
Client: Urban & Civic	Depth 2.40	Logged RP

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.30	72.69		TOPSOIL: Grey friable slightly sandy slightly gravelly CLAY. Gravel is fine to medium sub angular chalk.	
	1.50	B		2.40	70.59		Cream clayey structureless CHALK. Recovered as fine to coarse angular gravel with occasional cobbles.	1
							End of Pit at 2.40m	2
								3
								4

Remarks: No groundwater encountered.	
Stability: Stable	
Plant: 10T tracked excavator	

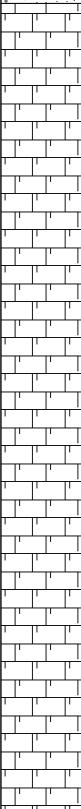


Trial Pit Log

TrialPit No
TP-R1-10
Sheet 1 of 1

Project Name: Baldock	Project No. 2899	Co-ords: 526066.78 - 234555.08 Level: 73.14	Date 28/11/2023
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Location: Baldock, North Hertfordshire	Dimensions (m): 2.50 0.75	Scale 1:20
Client: Urban & Civic	Depth 2.60	Logged RP

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.40	ES		0.30 0.45	72.84 72.69	  	TOPSOIL: Grey friable slightly sandy slightly gravelly CLAY. Gravel is fine to medium of sub angular chalk. Light brown friable very sandy slightly gravelly CLAY. Gravel is fine subangular chalk. Cream clayey structureless CHALK. Recovered as fine to coarse angular gravel.
	2.00	B		2.60	70.54		End of Pit at 2.60m

Remarks: No groundwater encountered.	
Stability: Stable	
Plant: 10T tracked excavator	



Windowless Sample Log

Borehole No.
WS-R1-01
Sheet 1 of 1

Project Name: Baldock

Project No.
2899

Co-ords: 525959E - 234806N

Hole Type
WLS

Location: Baldock, North Hertfordshire

Level: 71.89

Scale
1:25

Client: Urban & Civic

Dates: 14/11/2023

Logged By
HB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.15	ES	N=45 (2,4/4,9,13,19) N=78 (15,13/17,14,27,20)	0.30	71.59		Grass over TOPSOIL - Brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse, angular to sub-angular of chert.	1
		0.40 - 0.50	D					Structureless CHALK composed of loose white mottled creamy brown silty gravel. Gravel is consists of very weak medium density angular to sub-angular, fine to coarse chalk.	
		0.80 - 0.90	D		0.70	71.19		Loose orangish brown gravelly SAND. Gravel is fine to coarse, angular to sub-angular of chalk and flint.	
		1.00 1.10 - 1.20	SPT D					Structureless CHALK composed of white mottled cream gravelly CLAY. Gravel consist of very weak medium density angular to sub-angular fine to coarse chalk, Grade D.	
		1.35	SPT		1.85	70.04			
								End of Borehole at 1.85m	2
									3
									4
									5

Remarks

Potential groundwater at 1.00m.





Windowless Sample Log

Borehole No.
WS-R1-02
Sheet 1 of 1

Project Name: Baldock

Project No.
2899

Co-ords: 525977E - 234770N

Hole Type
WLS

Location: Baldock, North Hertfordshire

Level: 71.80

Scale
1:25

Client: Urban & Civic

Dates: 14/11/2023

Logged By
HB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.15	D	N=21 (2,4/4,4,6,7)	0.30	71.50		Grass over TOPSOIL - Brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse, angular to sub-angular of chert.	1
		0.40 - 0.50	ES		0.50	71.30		Firm slightly sandy slightly gravelly CLAY. Gravel is fine to coarse, angular to sub-angular of chalk.	
		0.70 - 0.80	D		0.80	71.00		Loose orangish brown gravelly SAND. Gravel is fine to coarse, angular to sub-angular of chalk and flint.	
		1.00	SPT		1.20	70.60		Structureless CHALK composed of loose white mottled creamy brown silty gravel. Gravel is consists of very weak medium density angular to sub-angular, fine to coarse chalk.	
		1.50 - 1.60	D	N=44 (8,11/13,8,10,13)				Structureless CHALK composed of white mottled off white gravelly CLAY. Gravel consist of very weak medium density angular to sub-angular fine to coarse chalk, Grade D.	2
		2.00	SPT						
		2.60 - 2.70	D	N=77 (14,15/26,31,20,0)					3
		2.70	SPT						
					3.00	68.80		End of Borehole at 3.00m	4
									5

Remarks

Potential groundwater encountered at 1.20m





Windowless Sample Log

Borehole No.
WS-R1-03
Sheet 1 of 1

Project Name: Baldock

Project No.
2899

Co-ords: 526046E - 234667N

Hole Type
WLS

Location: Baldock, North Hertfordshire

Level: 72.28

Scale
1:25

Client: Urban & Civic

Dates: 23/11/2023

Logged By
RK

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.15	ES		0.30	71.98		Scrub grass over brown friable slightly sandy slightly gravelly clayey TOPSOIL. Gravel is fine to coarse, angular to sub rounded of chalk and flint. TOPSOIL	1
		0.40 - 0.50	D					Structureless CHALK recovered as sandy angular to subrounded fine to coarse GRAVEL. Clasts are very weak to weak low density white. Matrix is light brown.	
		1.00 - 1.20 1.00	D SPT	N=27 (4,8/9,5,5,8)	0.80	71.48		Structureless CHALK recovered as angular to subrounded fine to coarse GRAVEL. Clasts are very weak to weak low and medium density white. Matrix is white.	
		2.00 - 2.20 2.00	D SPT	N=32 (3,8/7,6,9,10)					
		3.00 - 3.20 3.00	D SPT	N=48 (7,12/10,8,14,16)	3.45	68.83		End of Borehole at 3.45m	3
									4
									5

Remarks
No groundwater encountered.





Windowless Sample Log

Borehole No.
WS-R1-04
Sheet 1 of 1

Project Name: Baldock

Project No.
2899

Co-ords: 526058E - 234619N

Hole Type
WLS

Location: Baldock, North Hertfordshire

Level: 73.20

Scale
1:25

Client: Urban & Civic

Dates: 23/11/2023

Logged By
RK

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	ES		0.30	72.90		Scrub grass over brown friable slightly sandy slightly gravelly clayey TOPSOIL. Gravel is fine to coarse, angular to sub rounded of chalk and flint. TOPSOIL.	
		0.60 - 0.70	D					Structureless CHALK recovered as slightly sandy angular to subrounded fine to coarse GRAVEL. Clasts are very weak to weak low density white. Matrix is light brown.	
		1.00	SPT	N=27 (4,5/7,7,7,6)		Structureless CHALK recovered as angular to subrounded fine to coarse GRAVEL. Clasts are very weak to weak low and medium density white. Matrix is off white.			
		1.40 - 1.50	D						
		1.55	SPT	N=35 (12,16/10,6,8,11)					
		2.00	SPT	N=53 (5,9/13,11,13,16)					
2.45				End of Borehole at 2.45m					

Remarks
No groundwater encountered.



APPENDIX D

CHEMICAL ANALYSIS



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i2 Analytical Ltd.
7 Woodshots Meadow,
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Analytical Report Number : 23-75868

Project / Site name:	Baldock Bridges	Samples received on:	12/12/2023
Your job number:	2899	Samples instructed on / Analysis started on:	20/12/2023
Your order number:	2803	Analysis completed by:	09/01/2024
Report Issue Number:	1	Report issued on:	09/01/2024
Samples Analysed:	8 soil samples		

Izabela Wójcik
Signed: _____
Izabela Wójcik
Senior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-75868
Project / Site name: Baldock Bridges
Your Order No: 2803

Lab Sample Number				2916340	2916341	2916342	2916343	2916344
Sample Reference				WS-R2/R3-04	TP-R1-10	TP-R1-08	TP-R2/R3-08	TP-R2/R3-10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00-1.10	0.40	0.15	0.10	0.15
Date Sampled				07/12/2023	08/12/2023	08/12/2023	08/12/2023	08/12/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	68	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	16	15	18	17	15
Total mass of sample received	kg	0.001	NONE	0.4	0.3	0.3	0.3	0.3

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	EWS	EWS	EWS	EWS	EWS

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.2	8.3	8	8	8.1
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0139	0.0129	0.0136	0.0124	0.0779
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	13.9	12.9	13.6	12.4	77.9
Organic Matter (automated)	%	0.1	MCERTS	0.6	1.7	3.5	3.9	3.1

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.05	0.09
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.32	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.29	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	2.8	0.32
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.66	0.07
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.05	0.11	3.7	1.2
Pyrene	mg/kg	0.05	MCERTS	< 0.05	0.05	0.12	3.1	1.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.05	1.7	0.78
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.07	1.6	0.75
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	0.1	1.9	1.1
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	0.05	0.87	0.44
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.07	1.7	0.9
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.05	0.78	0.52
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.25	0.14
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.08	0.98	0.61

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	< 0.80	20.8	8.03
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.5	4.9	8.2	13	13
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	1.3	1	0.8	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	0.4	0.4	0.5
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	7	11	17	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	10	9.9	25	24	26
Lead (aqua regia extractable)	mg/kg	1	MCERTS	7.9	13	36	63	65
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	6.6	9.8	15	16
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	33	28	66	120	120

Analytical Report Number: 23-75868
 Project / Site name: Baldock Bridges
 Your Order No: 2803

Lab Sample Number				2916340	2916341	2916342	2916343	2916344
Sample Reference				WS-R2/R3-04	TP-R1-10	TP-R1-08	TP-R2/R3-08	TP-R2/R3-10
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00-1.10	0.40	0.15	0.10	0.15
Date Sampled				07/12/2023	08/12/2023	08/12/2023	08/12/2023	08/12/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		
Petroleum Hydrocarbons								
TPH C10 - C40 EH_CU_ID_TOTAL				mg/kg	10	MCERTS	< 10	< 10
							< 10	24
								46

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-75868
Project / Site name: Baldock Bridges
Your Order No: 2803

Lab Sample Number				2916345	2916346	2916347
Sample Reference				TP-R4-07	TP-R5-08	TP-R5-09
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.15	0.20	0.50
Date Sampled				08/12/2023	08/12/2023	08/12/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	16	13
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.3

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	EWS	EWS	EWS

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.2	8.3	8.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0105	0.01	0.0169
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	10.5	10	16.9
Organic Matter (automated)	%	0.1	MCERTS	4.8	4.4	2.3

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.07	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.13	0.17	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.14	0.17	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.06	0.07	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.07	0.13	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.11	0.14	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.07	0.11	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.08	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.13	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	1.12	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	12	11
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	0.7	1.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.5	0.4
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	20	32	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	23	28	11
Lead (aqua regia extractable)	mg/kg	1	MCERTS	62	70	16
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	18	17
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.1	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	93	55

Analytical Report Number: 23-75868
 Project / Site name: Baldock Bridges
 Your Order No: 2803

Lab Sample Number				2916345	2916346	2916347			
Sample Reference				TP-R4-07	TP-R5-08	TP-R5-09			
Sample Number				None Supplied	None Supplied	None Supplied			
Depth (m)				0.15	0.20	0.50			
Date Sampled				08/12/2023	08/12/2023	08/12/2023			
Time Taken				None Supplied	None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status						
Petroleum Hydrocarbons									
TPH C10 - C40_EH_CU_ID_TOTAL				mg/kg	10	MCERTS			
				< 10	< 10	< 10			

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-75868

Project / Site name: Baldock Bridges

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2916340	WS-R2/R3-04	None Supplied	1.00-1.10	Brown clay and sand with gravel and chalk.
2916341	TP-R1-10	None Supplied	0.4	Brown loam and clay with stones.
2916342	TP-R1-08	None Supplied	0.15	Brown loam with gravel.
2916343	TP-R2/R3-08	None Supplied	0.1	Brown loam with gravel and vegetation.
2916344	TP-R2/R3-10	None Supplied	0.15	Brown loam with gravel and vegetation.
2916345	TP-R4-07	None Supplied	0.15	Brown loam with gravel and vegetation.
2916346	TP-R5-08	None Supplied	0.2	Brown loam with gravel and vegetation.
2916347	TP-R5-09	None Supplied	0.5	Brown loam with gravel and vegetation.

Analytical Report Number : 23-75868
Project / Site name: Baldock Bridges

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. Refer to CoA for analyte specific accreditation.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Analytical Report Number : 23-75868
Project / Site name: Baldock Bridges

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report



Analytical Report Number : 23-75868

Project / Site name: Baldock Bridges

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
TP-R1-08	None Supplied	S	2916342	c	Total cyanide in soil	L080-PL	c
TP-R1-10	None Supplied	S	2916341	c	Total cyanide in soil	L080-PL	c
TP-R2/R3-08	None Supplied	S	2916343	c	Total cyanide in soil	L080-PL	c
TP-R2/R3-10	None Supplied	S	2916344	c	Total cyanide in soil	L080-PL	c
TP-R4-07	None Supplied	S	2916345	c	Total cyanide in soil	L080-PL	c
TP-R5-08	None Supplied	S	2916346	c	Total cyanide in soil	L080-PL	c
TP-R5-09	None Supplied	S	2916347	c	Total cyanide in soil	L080-PL	c
WS-R2/R3-04	None Supplied	S	2916340	c	Total cyanide in soil	L080-PL	c



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Analytical Report Number : 24-77465

Project / Site name:	Baldock (Bridges)	Samples received on:	21/12/2023
Your job number:	2899	Samples instructed on / Analysis started on:	09/01/2024
Your order number:	2812	Analysis completed by:	16/01/2024
Report Issue Number:	1	Report issued on:	16/01/2024
Samples Analysed:	13 soil samples		

Signed: _____

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 24-77465
Project / Site name: Baldock (Bridges)
Your Order No: 2812

Lab Sample Number	2924386				2924387	2924388	2924389	2924390
Sample Reference	TP-R1-04				TP-R1-06	TP-R3-04	TP-R4-02	TP-R5-01
Sample Number	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.10-0.15				0.40-0.50	0.10-0.15	0.10-0.15	0.10-0.15
Date Sampled	13/12/2023				15/12/2023	15/12/2023	14/12/2023	14/12/2023
Time Taken	None Supplied				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	23	23	12	18	14
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.3	0.3	0.3

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	SCA	N/A	SCA	SCA	SCA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.2	8.1	8.3	8.1	8.1
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0115	0.0143	0.011	0.0203	0.0152
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	11.5	14.3	11	20.3	15.2
Organic Matter (automated)	%	0.1	MCERTS	3.7	3.2	2.5	5.1	3.5

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.12	0.15	< 0.05	0.1	0.22
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.28	0.19	0.11	0.18	0.48
Pyrene	mg/kg	0.05	MCERTS	0.26	0.16	0.11	0.16	0.43
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.17	0.08	< 0.05	0.09	0.23
Chrysene	mg/kg	0.05	MCERTS	0.18	0.1	< 0.05	0.09	0.24
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.25	0.15	< 0.05	0.14	0.3
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.08	< 0.05	< 0.05	< 0.05	0.1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.22	0.11	< 0.05	0.12	0.24
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.11	< 0.05	< 0.05	0.07	0.12
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.13	< 0.05	< 0.05	0.08	0.14

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	1.8	0.94	< 0.80	1.03	2.55
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.4	9.1	13	8.3	12
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	1.7	1.6	2.1	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.4	< 0.2	0.4	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	15	24	13	28
Copper (aqua regia extractable)	mg/kg	1	MCERTS	24	24	20	25	24
Lead (aqua regia extractable)	mg/kg	1	MCERTS	40	39	39	37	40
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	10	10	15	8.8	14
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	61	53	54	68	69

Petroleum Hydrocarbons

TPH C10 - C40 EH, CU, 1D, TOTAL	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
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Analytical Report Number: 24-77465
 Project / Site name: Baldock (Bridges)
 Your Order No: 2812

Lab Sample Number				2924386	2924387	2924388	2924389	2924390
Sample Reference				TP-R1-04	TP-R1-06	TP-R3-04	TP-R4-02	TP-R5-01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10-0.15	0.40-0.50	0.10-0.15	0.10-0.15	0.10-0.15
Date Sampled				13/12/2023	15/12/2023	15/12/2023	14/12/2023	14/12/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-77465
Project / Site name: Baldock (Bridges)
Your Order No: 2812

Lab Sample Number				2924391	2924392	2924393	2924394	2924395
Sample Reference				TP-R5-06	TP-R5-07	WS-R1-02	WS-R1-04	WS-R2-03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10-0.15	0.50-0.60	0.10-0.15	0.10-0.20	0.50-0.60
Date Sampled				14/12/2023	14/12/2023	14/12/2023	13/12/2023	13/12/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	18	22	14	13
Total mass of sample received	kg	0.001	NONE	0.3	0.3	0.3	0.3	0.3

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	Not-detected	Not-detected	-
Asbestos Analyst ID	N/A	N/A	N/A	SCA	N/A	SCA	SCA	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8	8.3	8.6	8.5	9.1
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.11	0.0349	0.0187	0.0505	0.0077
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	110	34.9	18.7	50.5	7.7
Organic Matter (automated)	%	0.1	MCERTS	4.4	1.6	3.4	2	< 0.1

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.2	< 0.05	< 0.05	0.09	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.17	< 0.05	< 0.05	0.09	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.11	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.14	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.17	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.06	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.13	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.07	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.08	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	1.13	< 0.80	< 0.80	< 0.80	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	6.1	9.6	8.3	6.1
Boron (water soluble)	mg/kg	0.2	MCERTS	2	1.2	1.7	2	< 0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.5	0.8	0.5	12	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19	11	12	13	5
Copper (aqua regia extractable)	mg/kg	1	MCERTS	29	21	24	60	4.3
Lead (aqua regia extractable)	mg/kg	1	MCERTS	45	19	38	86	3.7
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	8.9	11	14	5.2
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	1.2	1.3	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	78	55	60	150	16

Petroleum Hydrocarbons

TPH C10 - C40 _{EH,CU,1D,TOTAL}	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
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Analytical Report Number: 24-77465
 Project / Site name: Baldock (Bridges)
 Your Order No: 2812

Lab Sample Number				2924391	2924392	2924393	2924394	2924395
Sample Reference				TP-R5-06	TP-R5-07	WS-R1-02	WS-R1-04	WS-R2-03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10-0.15	0.50-0.60	0.10-0.15	0.10-0.20	0.50-0.60
Date Sampled				14/12/2023	14/12/2023	14/12/2023	13/12/2023	13/12/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-77465
Project / Site name: Baldock (Bridges)
Your Order No: 2812

Lab Sample Number	2924396			2924397	2924398
Sample Reference	WS-R5-02			WS-R5-03	WS-R5-04
Sample Number	None Supplied			None Supplied	None Supplied
Depth (m)	0.10-0.15			0.50-0.60	0.15
Date Sampled	13/12/2023			13/12/2023	13/12/2023
Time Taken	None Supplied			None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	22
Total mass of sample received	kg	0.001	NONE	0.3	0.3

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	SCA	N/A	SCA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.3	8.3	7.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0575	0.143	0.0933
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	57.5	143	93.3
Organic Matter (automated)	%	0.1	MCERTS	4.1	2	3.8

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.06
Phenanthrene	mg/kg	0.05	MCERTS	0.1	0.14	0.36
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.08
Fluoranthene	mg/kg	0.05	MCERTS	0.2	0.17	0.65
Pyrene	mg/kg	0.05	MCERTS	0.17	0.17	0.62
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.13	0.09	0.26
Chrysene	mg/kg	0.05	MCERTS	0.09	0.09	0.32
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.13	0.09	0.36
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.05	0.05	0.16
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.11	0.1	0.35
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.05	< 0.05	0.22
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.07
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.08	< 0.05	0.29

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	1.11	0.9	3.85
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.3	8	14
Boron (water soluble)	mg/kg	0.2	MCERTS	2.5	0.9	2.9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.9	0.9	2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	14	17	23
Copper (aqua regia extractable)	mg/kg	1	MCERTS	45	77	76
Lead (aqua regia extractable)	mg/kg	1	MCERTS	41	27	80
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	12	14	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.3	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	96	140	160

Petroleum Hydrocarbons

TPH C10 - C40 EH, CU, 1D, TOTAL	mg/kg	10	MCERTS	< 10	11	17
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Analytical Report Number: 24-77465
 Project / Site name: Baldock (Bridges)
 Your Order No: 2812

Lab Sample Number				2924396	2924397	2924398
Sample Reference				WS-R5-02	WS-R5-03	WS-R5-04
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.10-0.15	0.50-0.60	0.15
Date Sampled				13/12/2023	13/12/2023	13/12/2023
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 24-77465
Project / Site name: Baldock (Bridges)

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2924386	TP-R1-04	None Supplied	0.10-0.15	Brown clay and sand with gravel.
2924387	TP-R1-06	None Supplied	0.40-0.50	Brown clay and sand with gravel and vegetation.
2924388	TP-R3-04	None Supplied	0.10-0.15	Brown loam and sand with gravel and vegetation.
2924389	TP-R4-02	None Supplied	0.10-0.15	Brown loam and sand with gravel and vegetation.
2924390	TP-R5-01	None Supplied	0.10-0.15	Brown loam and sand with gravel and vegetation.
2924391	TP-R5-06	None Supplied	0.10-0.15	Brown loam and clay with gravel and vegetation.
2924392	TP-R5-07	None Supplied	0.50-0.60	Brown clay and sand with chalk.
2924393	WS-R1-02	None Supplied	0.10-0.15	Brown clay with gravel.
2924394	WS-R1-04	None Supplied	0.10-0.20	Brown loam and sand with gravel and chalk.
2924395	WS-R2-03	None Supplied	0.50-0.60	Beige clay and sand with chalk.
2924396	WS-R5-02	None Supplied	0.10-0.15	Brown loam and clay with chalk.
2924397	WS-R5-03	None Supplied	0.50-0.60	Brown clay and sand with gravel.
2924398	WS-R5-04	None Supplied	0.15	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 24-77465
Project / Site name: Baldock (Bridges)

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards. Refer to CoA for analyte specific accreditation.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS

Analytical Report Number : 24-77465
Project / Site name: Baldock (Bridges)

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report



Analytical Report Number : 24-77465
Project / Site name: Baldock (Bridges)

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
TP-R1-04	None Supplied	S	2924386	c	Speciated EPA-16 PAHs in soil	L064-PL	c
TP-R1-04	None Supplied	S	2924386	c	TPH Banding in Soil by FID	L076-PL	c
TP-R1-04	None Supplied	S	2924386	c	Total cyanide in soil	L080-PL	c
TP-R1-06	None Supplied	S	2924387	c	Speciated EPA-16 PAHs in soil	L064-PL	c
TP-R1-06	None Supplied	S	2924387	c	TPH Banding in Soil by FID	L076-PL	c
TP-R1-06	None Supplied	S	2924387	c	Total cyanide in soil	L080-PL	c
TP-R3-04	None Supplied	S	2924388	c	Speciated EPA-16 PAHs in soil	L064-PL	c
TP-R3-04	None Supplied	S	2924388	c	TPH Banding in Soil by FID	L076-PL	c
TP-R3-04	None Supplied	S	2924388	c	Total cyanide in soil	L080-PL	c
TP-R4-02	None Supplied	S	2924389	c	Speciated EPA-16 PAHs in soil	L064-PL	c
TP-R4-02	None Supplied	S	2924389	c	TPH Banding in Soil by FID	L076-PL	c
TP-R4-02	None Supplied	S	2924389	c	Total cyanide in soil	L080-PL	c
TP-R5-01	None Supplied	S	2924390	c	Speciated EPA-16 PAHs in soil	L064-PL	c
TP-R5-01	None Supplied	S	2924390	c	TPH Banding in Soil by FID	L076-PL	c
TP-R5-01	None Supplied	S	2924390	c	Total cyanide in soil	L080-PL	c
TP-R5-06	None Supplied	S	2924391	c	Speciated EPA-16 PAHs in soil	L064-PL	c
TP-R5-06	None Supplied	S	2924391	c	TPH Banding in Soil by FID	L076-PL	c
TP-R5-06	None Supplied	S	2924391	c	Total cyanide in soil	L080-PL	c
TP-R5-07	None Supplied	S	2924392	c	Speciated EPA-16 PAHs in soil	L064-PL	c
TP-R5-07	None Supplied	S	2924392	c	TPH Banding in Soil by FID	L076-PL	c
TP-R5-07	None Supplied	S	2924392	c	Total cyanide in soil	L080-PL	c
WS-R1-02	None Supplied	S	2924393	c	Speciated EPA-16 PAHs in soil	L064-PL	c
WS-R1-02	None Supplied	S	2924393	c	TPH Banding in Soil by FID	L076-PL	c
WS-R1-02	None Supplied	S	2924393	c	Total cyanide in soil	L080-PL	c
WS-R1-04	None Supplied	S	2924394	c	Speciated EPA-16 PAHs in soil	L064-PL	c
WS-R1-04	None Supplied	S	2924394	c	TPH Banding in Soil by FID	L076-PL	c
WS-R1-04	None Supplied	S	2924394	c	Total cyanide in soil	L080-PL	c
WS-R2-03	None Supplied	S	2924395	c	Speciated EPA-16 PAHs in soil	L064-PL	c
WS-R2-03	None Supplied	S	2924395	c	TPH Banding in Soil by FID	L076-PL	c
WS-R2-03	None Supplied	S	2924395	c	Total cyanide in soil	L080-PL	c
WS-R5-02	None Supplied	S	2924396	c	Speciated EPA-16 PAHs in soil	L064-PL	c
WS-R5-02	None Supplied	S	2924396	c	TPH Banding in Soil by FID	L076-PL	c
WS-R5-02	None Supplied	S	2924396	c	Total cyanide in soil	L080-PL	c
WS-R5-03	None Supplied	S	2924397	c	Speciated EPA-16 PAHs in soil	L064-PL	c
WS-R5-03	None Supplied	S	2924397	c	TPH Banding in Soil by FID	L076-PL	c
WS-R5-03	None Supplied	S	2924397	c	Total cyanide in soil	L080-PL	c
WS-R5-04	None Supplied	S	2924398	c	Speciated EPA-16 PAHs in soil	L064-PL	c
WS-R5-04	None Supplied	S	2924398	c	TPH Banding in Soil by FID	L076-PL	c
WS-R5-04	None Supplied	S	2924398	c	Total cyanide in soil	L080-PL	c

APPENDIX E

GEOTECHNICAL ANALYSIS



TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DP

Contact: Stephen Fisk
Site Address: Baldock Bridges

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: 2899
Job Number: 24-77864-1
Date Sampled: Not Given
Date Received: 09/01/2024
Date Tested: 19/01/2024
Sampled By: Not Given

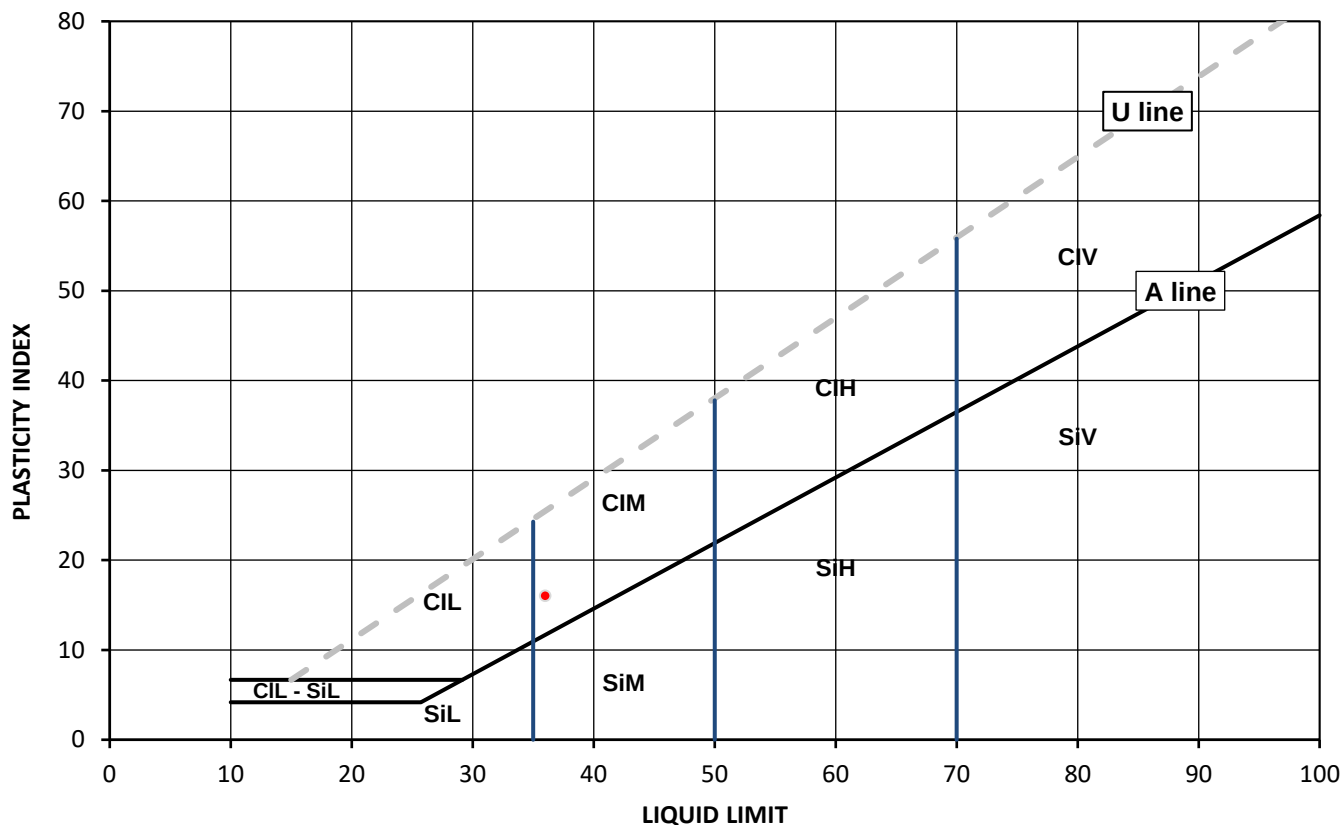
Test Results:

Laboratory Reference: 2926743
Hole No.: TP-R1-01
Sample Reference: Not Given
Sample Description: Brown sandy CLAY

Depth Top [m]: 0.40
Depth Base [m]: 0.50
Sample Type: B

Sample Preparation: Tested after washing to remove >425um

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
28	36	20	16	76



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	L Low below 35
Si	Silt	M Medium 35 to 50
		H High 50 to 70
		V Very high exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DP

Contact: Stephen Fisk
Site Address: Baldock Bridges

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: 2899
Job Number: 24-77864-1
Date Sampled: Not Given
Date Received: 09/01/2024
Date Tested: 19/01/2024
Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type							
2926395	TP-R1-02	Not Given	1.00	1.20	B	White CHALK with fragments of roots		23	Sample was quartered, oven dried at 106 °C			
2926396	TP-R1-04	Not Given	3.00	3.20	B	White CHALK		27	Sample was quartered, oven dried at 108.7 °C			
2926397	TP-R1-05	Not Given	1.00	1.20	B	White CHALK		28	Sample was quartered, oven dried at 108.7 °C			
2926398	TP-R1-06	Not Given	2.50	2.60	B	White CHALK		31	Sample was quartered, oven dried at 108.7 °C			
2926399	TP-R1-07	Not Given	1.50	Not Given	B	White CHALK with fragments of plants		27	Sample was quartered, oven dried at 108.7 °C			
2926400	TP-R1-08	Not Given	2.00	Not Given	B	White CHALK		29	Sample was quartered, oven dried at 108.7 °C			
2926401	TP-R1-09	Not Given	1.50	Not Given	B	White CHALK		31	Sample was quartered, oven dried at 108.7 °C			
2926743	TP-R1-01	Not Given	0.40	0.50	B	Brown sandy CLAY		28	Sample was quartered, oven dried at 108.7 °C			

Comments:

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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4041

TEST CERTIFICATE**DETERMINATION OF PARTICLE SIZE DISTRIBUTION**

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DP

Contact: Stephen Fisk
Site Address: Baldock Bridges

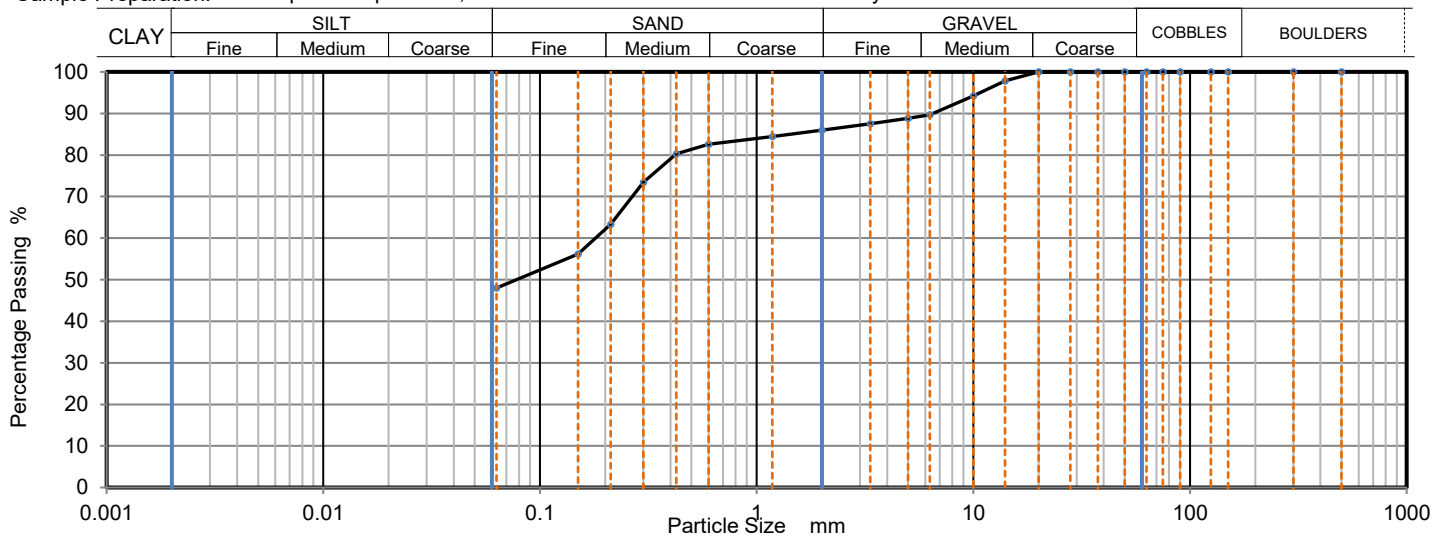
Client Reference: 2899
Job Number: 24-77864-1
Date Sampled: Not Given
Date Received: 09/01/2024
Date Tested: 19/01/2024
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 2926743
Hole No.: TP-R1-01
Sample Reference: Not Given
Sample Description: Brown sandy CLAY
Sample Preparation: Sample was quartered, oven dried at 108.7 °C and broken down by hand.

Depth Top [m]: 0.40
Depth Base [m]: 0.50
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	98		
10	94		
6.3	90		
5	89		
3.35	88		
2	86		
1.18	84		
0.6	83		
0.425	80		
0.3	73		
0.212	63		
0.15	56		
0.063	48		

Sample Proportions	% dry mass
Very coarse	0
Gravel	14
Sand	38
Fines <0.063mm	48

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	> 2.9
Curvature Coefficient	

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:**Signed:**

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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4041

TEST CERTIFICATE**DETERMINATION OF DRY DENSITY/MOISTURE
CONTENT RELATIONSHIP METHOD USING
4.5 KG RAMMER**

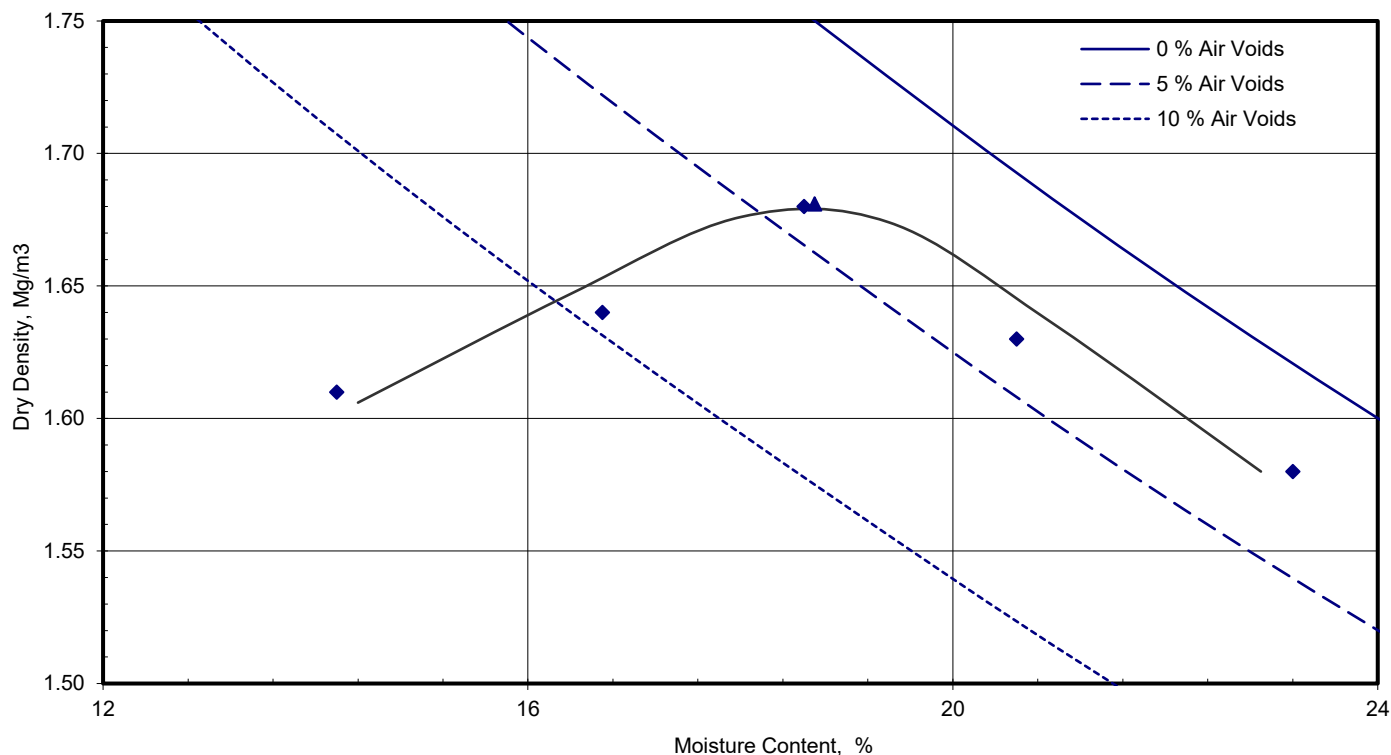
Tested in Accordance with: BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DPContact: Stephen Fisk
Site Address: Baldock BridgesClient Reference: 2899
Job Number: 24-77864-1
Date Sampled: Not Given
Date Received: 09/01/2024
Date Tested: 23/01/2024
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:Laboratory Reference: 2926395
Hole No.: TP-R1-02
Sample Reference: Not Given
Sample Description: White CHALK with fragments of roots
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.Depth Top [m]: 1.00
Depth Base [m]: 1.20
Sample Type: B

Compaction Point No.		1	2	3	4	5
Moisture Content	%	14	17	19	21	23
Dry Density	Mg/m³	1.61	1.64	1.68	1.63	1.58

Mould Type		CBR
Samples Used		Single sample tested
Dry Mass Retained on 37.5 mm Sieve	%	0
Dry Mass Retained on 20.0 mm Sieve	%	39
Particle Density - Assumed	Mg/m³	2.60
As received Moisture Content	%	23
Maximum Dry Density	Mg/m³	1.68

Optimum Moisture Content	%	19
--------------------------	---	----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.6 using 4.5kg [heavy] Rammer

Remarks: Coarse fragments were crushed to obtain sufficient mass of size fraction suitable to carry out the test.
Test performed at per client request.

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP METHOD USING 4.5 KG RAMMER

Tested in Accordance with: BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DP

Contact: Stephen Fisk
Site Address: Baldock Bridges

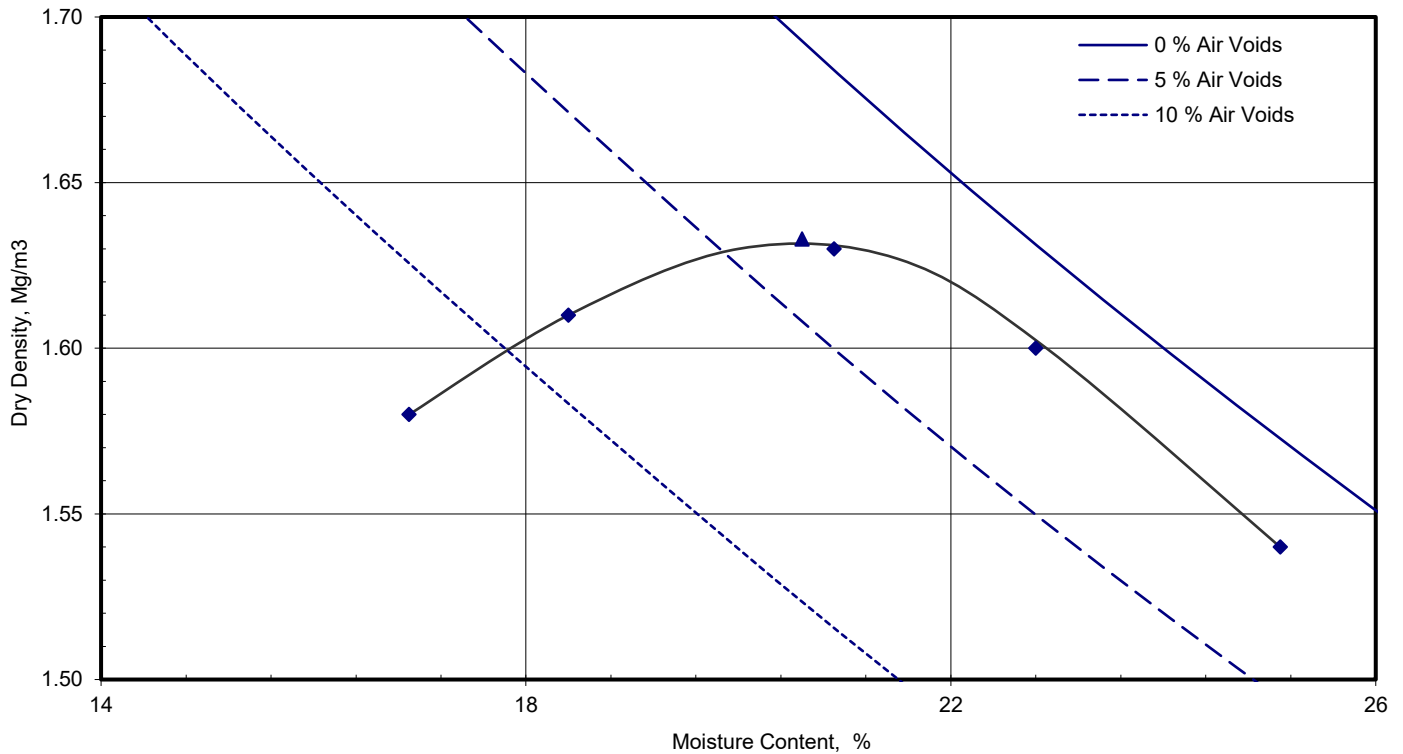
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: 2899
Job Number: 24-77864-1
Date Sampled: Not Given
Date Received: 09/01/2024
Date Tested: 23/01/2024
Sampled By: Not Given

Test Results:

Laboratory Reference: 2926399
Hole No.: TP-R1-07
Sample Reference: Not Given
Sample Description: White CHALK with fragments of plants
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.

Depth Top [m]: 1.50
Depth Base [m]: Not Given
Sample Type: B



Compaction Point No.		1	2	3	4	5
Moisture Content	%	17	18	21	23	25
Dry Density	Mg/m³	1.58	1.61	1.63	1.60	1.54

Mould Type		CBR
Samples Used		Single sample tested
Dry Mass Retained on 37.5 mm Sieve	%	0
Dry Mass Retained on 20.0 mm Sieve	%	36
Particle Density - Assumed	Mg/m³	2.60
As received Moisture Content	%	28
Maximum Dry Density	Mg/m³	1.63

Optimum Moisture Content	%	21
--------------------------	---	----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.6 using 4.5kg [heavy] Rammer

Remarks: Coarse fragments were crushed to obtain sufficient mass of size fraction suitable to carry out the test.
Test performed at per client request

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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4041

TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DP

Contact: Stephen Fisk
Site Address: Baldock Bridges

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: 2899
Job Number: 24-77864-1
Date Sampled: Not Given
Date Received: 09/01/2024
Date Tested: 25/01/2024
Sampled By: Not Given

Test Results:

Laboratory Reference: 2926397
Hole No.: TP-R1-05
Sample Reference: Not Given
Sample Description: White CHALK

Depth Top [m]: 1.00
Depth Base [m]: 1.20
Sample Type: B

Specimen Preparation:

Condition Remoulded
Details Recompacted with specified standard effort using 2.5kg rammer

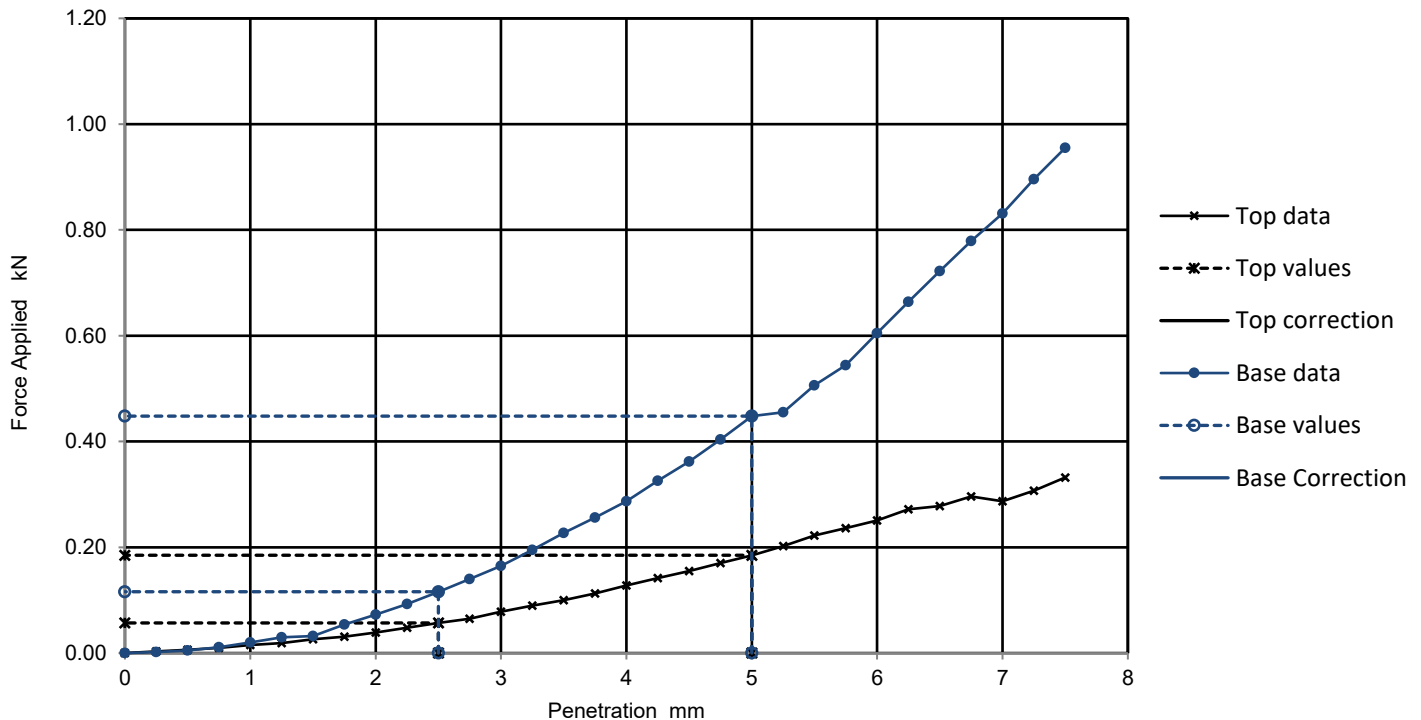
Soaking details Not soaked
Period of soaking days
Time to surface days
Amount of swell recorded mm
Dry density after soaking Mg/m3

Material retained on 20mm sieve removed 52 %

Initial Specimen details Bulk density 1.98 Mg/m3
Dry density 1.54 Mg/m3
Moisture content 29 %

Surcharge applied 8 kg
4.9 kPa

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
No	0.43	0.93	0.93	
No	0.88	2.2	2.2	

Moisture Content %
28
30

Remarks: Test carried out with > 25 % retained on 20mm as per clause 7.2.1.2 according to the client's request
Test/ Specimen specific remarks:

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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4041

TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DP

Contact: Stephen Fisk
Site Address: Baldock Bridges

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: 2899
Job Number: 24-77864-1
Date Sampled: Not Given
Date Received: 09/01/2024
Date Tested: 25/01/2024
Sampled By: Not Given

Test Results:

Laboratory Reference: 2926401
Hole No.: TP-R1-09
Sample Reference: Not Given
Sample Description: White CHALK

Depth Top [m]: 1.50
Depth Base [m]: Not Given
Sample Type: B

Specimen Preparation:

Condition Remoulded
Details Recompacted with specified standard effort using 2.5kg rammer

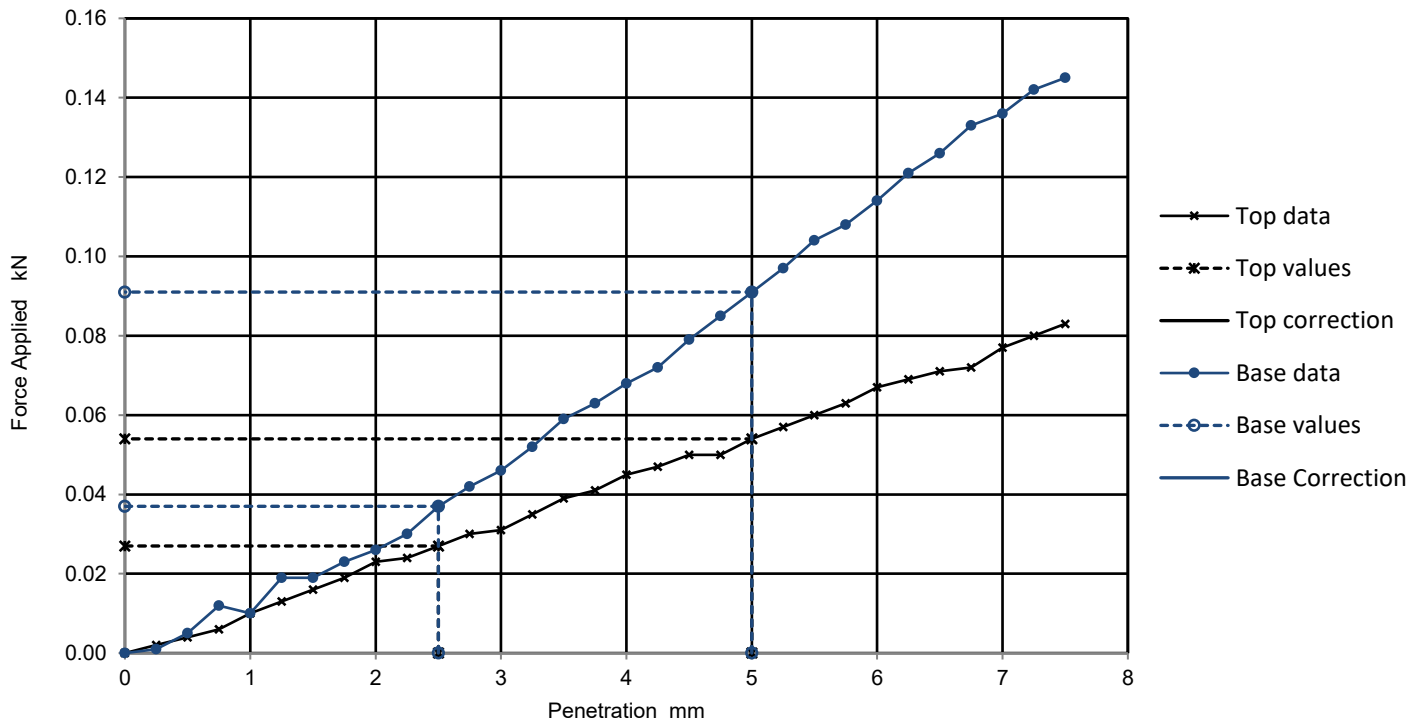
Soaking details Not soaked
Period of soaking days
Time to surface days
Amount of swell recorded mm
Dry density after soaking Mg/m³

Material retained on 20mm sieve removed 43 %

Initial Specimen details Bulk density 1.90 Mg/m³
Dry density 1.44 Mg/m³
Moisture content 32 %

Surcharge applied 8 kg
4.9 kPa

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
No	0.2	0.27	0.27	
No	0.28	0.46	0.46	

Moisture Content %
30
33

Remarks: Test carried out with > 25 % retained on 20mm as per clause 7.2.1.2 according to the client's request

Test/ Specimen specific remarks:

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

DETERMINATION OF THE CHALK CRUSHING VALUE (CCV)

Tested in Accordance with: BS 1377-4: 1990: Clause 6

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DP

Contact: Stephen Fisk
Site Address: Baldock Bridges

Client Reference: 2899
Job Number: 24-77864-1
Date Sampled: Not Given
Date Received: 09/01/2024
Date Tested: 24/01/2024
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Material >10 mm %	Specimen Moisture Content %	Saturated Moisture Content %	Chalk Crushing Value	Preparation
		Reference	Depth Top m	Depth Base m	Type							
2926395	TP-R1-02	Not Given	1.00	1.20	B	White CHALK with fragments of roots		55	27	26	2.6	
2926396	TP-R1-04	Not Given	3.00	3.20	B	White CHALK	Water ooze out of the mould after 30 blows	21	27	25	2.1	
2926398	TP-R1-06	Not Given	2.50	2.60	B	White CHALK	Water ooze out of the mould after 40 blows	34	30	31	3.2	

Comments:

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

METHOD FOR SATURATION MOISTURE CONTENT OF CHALK

Tested in Accordance with: BS 1377-2: 1990: Clause 3.3

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DP

Contact: Stephen Fisk
Site Address: Baldock Bridges

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: 2899
Job Number: 24-77864-1
Date Sampled: Not Given
Date Received: 09/01/2024
Date Tested: 19/01/2024
Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	SMC	Bulk density	Dry density	MC	Preparation
		Reference	Depth Top	Depth Base	Type							
			m	m				%	Mg/m3	Mg/m3	%	
2926395	TP-R1-02	Not Given	1.00	1.20	B	White CHALK with fragments of roots	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	26	1.95	1.60	22	
2926396	TP-R1-04	Not Given	3.00	3.20	B	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	25	1.99	1.61	24	
2926397	TP-R1-05	Not Given	1.00	1.20	B	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	25	1.99	1.60	24	
2926398	TP-R1-06	Not Given	2.50	2.60	B	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	31	1.90	1.47	30	
2926399	TP-R1-07	Not Given	1.50	Not Given	B	White CHALK with fragments of plants	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	26	1.99	1.59	25	
2926400	TP-R1-08	Not Given	2.00	Not Given	B	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	29	1.93	1.50	28	
2926401	TP-R1-09	Not Given	1.50	Not Given	B	White CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	28	1.96	1.55	27	

Note: SMC - Saturation Moisture Content; MC - Moisture Content

Comments:

Signed:

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

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APPENDIX F

GROUNDWATER AND GROUND GAS MONITORING RECORDS

The Shadbolt Group

18 Bewick Road, Gateshead, Tyne & Wear, NE8 4DP Tel: 0191 478 3330 Email: admin@shadboltgroup.net



SHADBOLT
ENVIRONMENTAL

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Baldock											Job No:		2899		
Client:	Urban & Civic											Date:		17/11/2023		
Monitored by:	HB											Weather:		Clear/Windy		
												Instruments Used:		GFM 436 + Dipmeter		
												Pressure Trend:		Rising		
Borehole		Borehole surface level (as surveyed)	CH4		CO2		O2		CO	H2S	Flow Rate	Atmospheric	Water	Water	Base	Remarks
			Peak	Steady	Peak	Steady	Peak	Steady	Steady	Steady	Peak (Steady)	Pressure	Depth	Depth	Depth	
			(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	PPM	PPM	(l/hr)	(mbar)	(m bgl)	(m aOD)	(m bgl)	
Ambient						20.4	20.4					1008				
RO-R1-01		71.05	0.0	0.0	0.5	0.5	20.1	20.1	0.0	0.0	0.0	1009	DRY	DRY	16.00	
RO-R1-02		72.40	0.0	0.0	0.5	0.4	19.4	19.4	0.0	0.0	0.0	1008	DRY	DRY	15.73	

Notes:

- 1 The peak reading is the maximum recorded level during a monitoring event.
- 2 The steady reading is the level which remained constant after approximately 1 minute.

The Shadbolt Group

18 Bewick Road, Gateshead, Tyne & Wear, NE8 4DP Tel: 0191 478 3330 Email: admin@shadboltgroup.net



SHADBOLT
ENVIRONMENTAL

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Baldock											Job No:		2899		
Client:	Urban & Civic											Date:		07/12/2023		
Monitored by:	HB											Weather:		Clear/Windy		
												Instruments Used:		GFM 436 + Dipmeter		
												Pressure Trend:		Falling		
Borehole		Borehole surface level (as surveyed)	CH4		CO2		O2		CO	H2S	Flow Rate	Atmospheric	Water	Water	Base	Remarks
			Peak	Steady	Peak	Steady	Peak	Steady	Steady	Steady	Peak (Steady)	Pressure	Depth	Depth	Depth	
			(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	PPM	PPM	(l/hr)	(mbar)	(m bgl)	(m aOD)	(m bgl)	
Ambient						0.0	19.9					992				
RO-R1-01		71.05	0.0	0.0	0.3	0.3	20.1	20.1	0.0	0.0	0.0	990	14.12	56.93	16.23	
RO-R1-02		72.40	0.0	0.0	0.5	0.6	19.2	19.2	0.0	0.0	0.0	990	15.29	57.11	15.83	
RO-R1-03		71.77	-	-	-	-	-	-	-	-	-	-	14.39	57.38	15.80	Bung Open
RO-R1-04		71.71	0.0	0.0	0.6	0.6	20.1	19.9	0.0	0.0	0.0	992	14.56	57.15	10.11	

Notes:

- 1 The peak reading is the maximum recorded level during a monitoring event.
- 2 The steady reading is the level which remained constant after approximately 1 minute.

The Shadbolt Group 18 Bewick Road, Gateshead, Tyne & Wear, NE8 4DP Tel: 0191 478 3330 Email: admin@shadboltgroup.net GROUNDWATER / GAS MONITORING RECORD SHEET  SHADBOLT ENVIRONMENTAL																
Site:	Baldock											Job No:		2899		
Client:	Urban & Civic											Date:		09/01/2024		
Monitored by:	HB											Weather:		Raining/Windy		
												Instruments Used:		GFM 436 + Dipmeter		
											Pressure Trend:		Decrease			
Borehole		Borehole surface level (as surveyed)	CH4		CO2		O2		CO	H2S	Flow Rate	Atmospheric	Water	Water	Base	Remarks
			Peak	Steady	Peak	Steady	Peak	Steady	Steady	Steady	Peak (Steady)	Pressure	Depth	Depth	Depth	
			(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	PPM	PPM	(l/hr)	(mbar)	(m bgl)	(m aOD)	(m bgl)	
Ambient						0.0	20.4					1021				
RO-R1-01		71.05	0.0	0.0	1.1	1.1	19.2	19.2	0.0	0.0	0.0	1021	11.65	59.40	15.99	
RO-R1-02		72.40	0.0	0.0	0.9	0.9	18.0	18.0	0.0	0.0	0.0	1021	13.00	59.40	15.82	
RO-R1-03		71.77	-	-	-	-	-	-	-	-	-	-	12.13	59.64	15.90	Bung Open
RO-R1-04		71.71	0.0	0.0	1.9	1.9	17.0	16.3	0.0	0.0	0.0	1021	11.91	59.80	15.80	
Notes:																
1 The peak reading is the maximum recorded level during a monitoring event.																
2 The steady reading is the level which remained constant after approximately 1 minute.																

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Site:	Baldock											Job No:		2899		
Client:	Urban & Civic											Date:		25/01/2024		
Monitored by:	HB											Weather:		Partly Cloudy		
												Instruments Used:		GFM 436 + Dipmeter		
											Pressure Trend:		Decrease			
Borehole		Borehole surface level (as surveyed)	CH4		CO2		O2		CO	H2S	Flow Rate	Atmospheric	Water	Water	Base	Remarks
			Peak	Steady	Peak	Steady	Peak	Steady	Steady	Steady	Peak (Steady)	Pressure	Depth	Depth	Depth	
			(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	PPM	PPM	(l/hr)	(mbar)	(m bgl)	(m aOD)	(m bgl)	
Ambient						0.0	20.9					1012				
RO-R1-01		71.05	0.0	0.0	0.9	0.9	19.4	19.4	0.0	0.0	0.0	1011	10.72	60.33	15.91	
RO-R1-02		72.40	0.0	0.0	0.8	0.8	19.8	19.6	0.0	0.0	0.0	1011	11.92	60.48	15.79	
RO-R1-03		71.77	0.0	0.0	0.7	0.7	20.1	20.0	0.0	0.0	0.0	1010	11.20	60.57	15.90	
RO-R1-04		71.71	0.0	0.0	0.6	0.6	20.0	19.4	0.0	0.0	0.0	1010	10.92	60.79	15.70	
Notes:																
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2 The steady reading is the level which remained constant after approximately 1 minute.																

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Site:	Baldock											Job No:		2899		
Client:	Urban & Civic											Date:		07/02/2024		
Monitored by:	HB											Weather:		Partly Cloudy		
												Instruments Used:		GFM 436 + Dipmeter		
												Pressure Trend:		Decrease		
Borehole		Borehole surface level (as surveyed)	CH4		CO2		O2		CO	H2S	Flow Rate	Atmospheric	Water	Water	Base	Remarks
			Peak	Steady	Peak	Steady	Peak	Steady	Steady	Steady	Peak (Steady)	Pressure	Depth	Depth	Depth	
			(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	PPM	PPM	(l/hr)	(mbar)	(m bgl)	(m aOD)	(m bgl)	
Ambient						0.0	20.3					994				
RO-R1-01		71.05	0.0	0.0	0.9	0.9	20.0	19.5	0.0	0.0	0.0	994	10.79	60.26	15.91	
RO-R1-02		72.40	0.0	0.0	0.8	0.8	19.7	19.4	0.0	0.0	0.0	994	12.05	60.35	15.73	
RO-R1-03		71.77	0.0	0.0	0.7	0.6	19.8	19.8	0.0	0.0	0.0	993	11.26	60.51	15.90	
RO-R1-04		71.71	0.0	0.0	1.4	1.4	19.4	19.2	0.0	0.0	0.0	993	10.99	60.72	15.70	
Notes:																
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SHADBOLT GROUP

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